

















PAPILIO.



*P. Urtica.*

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int.

ILLUSTRATIONS  
OF THE  
LINNÆAN GENERA  
OF  
INSECTS.

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Testaceologicus, &c.

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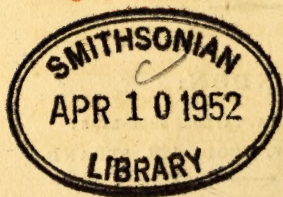
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# LINNÆAN GENERA

OF

## I N S E C T S.

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### ORDER III.

#### *LEPIDOPTERA.*

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**T**HE insects of this Order are particularly distinguished by their scaly wings, from which alone they derive their name of *Lepidoptera*. These wings are four in number, and are generally variegated by the most brilliant colours, entirely produced by an infinity of little oval scales, either of a conical or triangular shape, and placed one above another, like the tiles on the roof of a house. These scales, which may be called the feathers of the Butter-

fly, are fixed on a kind of pedicle, but come off on the fingers, like a farinaceous powder, with the slightest touch; leaving the bare wing, a thin, transparent, elastic membrane, devoid of beauty, and studded with longitudinal rays, showing the places to which the scales were formerly attached. The mouth in these insects is a sort of trunk, which is not unaptly called a spiral tongue, since when not in action, it is completely rolled up and placed between two palpi, or downy feelers, which hide it entirely. This trunk, which differs in length, and is sometimes very short, is composed of two pieces, or laminæ, convex on one side, and concave on the other. These laminæ are easily separated at the will of the insect, and when reunited form a hollow cylinder.

The Lepidoptera are so elegant in their appearance, and perfect in their shape, that they claim the highest rank among the numerous and extensive class of insects to which they belong. Such is their variegated beauty, and such the softness of their blended tints, that we might almost fancy them ethereal beings, who in their

passage through infinite space, had stained their wings in the colours of the rainbow.

The Lepidoptera are perfectly harmless, and have no organ with which they can either injure others or defend themselves. Their aërial state is comparatively transient. It is that short but gay period of perfection and enjoyment, when they may be seen in pairs, fluttering from flower to flower, and with their long extended tongue, searching each nectary, and extracting the sweets from every cup.

GENUS XLIII. *PAPILIO*.

## GENERIC CHARACTER.

*Antennæ* thickening towards the extremity, commonly ending in a knob, or club. *Wings* when at rest erect, meeting upwards, and touching above the body. *Flight* diurnal.

*General Observations.*

The sections into which Linnæus has divided this numerous tribe of insects are as follows :

1. *Equites*. With the upper wings longer from their hinder corner to their anterior extremity, than from the same point to their base. Their antennæ are frequently filiform.

The *Equites* are either

- α. Tröes*, or Trojans ; black with bloody spots on the breast, or
  - β. Achivi*, Greeks, without the red marks, but often with an eye-shaped spot on the inner angle of the lower wings.
2. *Heliconii*. With the wings narrow and entire, sometimes naked, especially towards the



extremities. Upper ones oblong; under ones very short.

3. *Danai*. Wings entire.

*α. Candidi*. With white wings.

*β. Festivi*. With variegated wings.

4. *Nymphales*. With scalloped or indented wings.

*A. Gemmati*. Wings adorned with eyes.

*α. ———* In the upper wings only.

*β. ———* In the under wings only.

*B. Phalerati*. The wings without eyes.

5. *Plebeii*. Butterflies of a small size, divided into

*α. Rurales*. With the wings obscurely spotted.

*β. Urbicoli*. In which the spots on the wings are often transparent.

The Butterflies of which this genus is entirely composed, differ completely in their habits from the insects of the two following genera, inasmuch as the former fly only in the open day, the latter in the twilight. Their larvæ, known universally by the name of cater-

pillars, when grown to their full size change into the chrysalis, and at the appointed time burst forth in all the plenitude of beauty.

## SPECIFICATION.

PAPILIO URTICÆ. P. alis angulatis fulvis nigro-maculatis: primoribus supra punctis tribus nigris.

*Linn. Syst. Nat. p. 777. Gmel. p. 2313. Fabr.*

*Spec. Ins. 2. p. 92. Mant. Ins. 2. p. 490.*

*Roesel. Ins. 1. pap. 1. t. 4.*

*Schaeff. Icon. t. 142. f. 1, 2.*

Inhabits the common nettle.

Pl. 43.

## GENUS XLIV. SPHINX.

## GENERIC CHARACTER.

*Antennæ* thickest in the middle, somewhat prism-shaped, and attenuated at each end.

*Wings* deflected. *Flight* slow and heavy.

*General Observations.*

The genus is divided into the following families :

1. *Legitimæ*.

*α*. With angulated wings.

*β*. With wings entire and the anus smooth.

*γ*. With the wings entire and the anus tufted.

2. *Adscitæ*. Differing from the others in their external appearance and caterpillars,

The Sphinges, which are generally known by the name of Hawk-Moths, confine their heavy flight to the close of evening, and the dawn of day. They may then be seen hovering about a flower ; and, without settling, inserting their long spiral tongue, to suck the

nectar from the bottom of the cup. When at rest they fold their antennæ under their breast. Some of the small species fly in the day-time.

The bodies of the caterpillars are for the most part large, smooth, and dotted, with a horn above the tail. They undergo their metamorphosis in the earth; and their chrysalids, which are inclosed in a sort of web of a coarse texture, remain locked under ground till the spring.

The large Death's-head Moth (*Sphinx Atropos*) from its formidable appearance, and death-like head upon its back, has been considered as an insect of ill omen, and the harbinger of fate. From its egg proceeds a large and beautiful caterpillar, of a bright yellow colour, spotted with black, and marked on the sides with seven violet and sky-blue stripes. It feeds on the potatoe and jasmine, and retires under ground in September.

#### SPECIFICATION.

SPHINX ATROPOS. S. alis integris: posticis luteis fasciis fuscis, abdomine luteo cingulis nigris. *Linn.*

S P E I N X .



*G. Atropes.*





*Syst. Nat.* p. 799. *Gmel.* p. 2378. *Fabr. Ent.*  
*Syst.* p. 539. *Spec. Ins.* 2. p. 1. *Mant. Ins.* 2.  
p. 95.

*Degeer, Ins.* 2. p. 242.

*Roesel. Ins.* 8. t. 1, 2.

*Panzer, Faun. Ins. Germ. fasc.* 8. t. 16.

Inhabits Europe. Found, but rarely, in England.

Pl. 44.

GENUS XLV. *PHALÆNA*.

## GENERIC CHARACTER.

*Antennæ* setaceous, decreasing in size from the base towards the point. *Wings* when at rest, in general deflected. *Flight* nocturnal.

*General Observations.*

The number of species of which this genus consists, has induced Linnæus to divide it into the following families :

1. *Attaci*. With wings inclining downwards and spreading open. These have either
  - $\alpha$ . Pectinated antennæ, without a tongue.
  - $\beta$ . ————— and a spiral tongue, or
  - $\gamma$ . Setaceous antennæ, with a spiral tongue.
2. *Bombyces*. With wings incumbent, and antennæ pectinated.
  - A. Elingues*, which want the spiral tongue.
    - $\alpha$ . With reversed wings.
    - $\beta$ . With deflexed wings.
  - B. Spirilingues*. With a spiral tongue.
    - $\alpha$ . With smooth backs.
    - $\beta$ . With crested, or tufted, backs.

3. *Noctuæ*. The wings incumbent as in the Bombyces, but the antennæ setaceous.  
A. *Elingues*, without tongues.  
B. *Spirilingues*, with spiral tongues.
4. *Geometræ*. Wings when at rest extended horizontally.  
A. *Pectinicornes*. With the antennæ pectinated.  
B. *Seticornes*. With the antennæ setaceous.
- The under wings in the above two divisions are either angulated or round.
5. *Tortrices*. With very obtuse wings, curved at the exterior margin. They have short, awl-pointed palpi.
6. *Pyralides*. With the inner margin of the wings laid one over the other, in shape resembling a delta, or triangle.
7. *Tineæ*. With the wings convoluted, or wrapped round the body, giving the insect almost a cylindrical shape. The front, or forehead, is stretched out.
8. *Alucitæ*. With digitated wings, divided

nearly to the base, and resembling distinct plumes.

Some moths fly by day ; but they may be said, generally, to avoid the light, and leave their lurking-places only in the evening. The caterpillars vary greatly in size and shape. Among the most singular is that of the *Phalæna Vinula*, or Poplar Moth. It is more than two inches long, with a flat face, and pointed shoulder ; but the tail is the most remarkable feature, being extended into two long tubular processes, which can be further lengthened at the pleasure of the animal.

Of the chrysalids of moths, some are quite simple, while others are provided with a hook at one end. All of them weave a covering, which, in such as pass their time under ground, is of very coarse materials. Many of the species attach themselves to the under sides of branches of trees, to walls, or any convenient substance chosen by the insect for that purpose. Of these the web is much finer, and generally contains more silk.





PHALÆNA.



*P. militaris.*

## SPECIFICATION.

PHALÆNA MILITARIS. Ph. alis concoloribus luteis  
apice maculisque violaceis: primoribus extus albo  
maculatis. *Linn. Syst. Nat. Gmel. p. 2407. Fabr.*  
*Spec. Ins. 2. p. 171. Mant. Ins. 2. p. 110.*

*Roesel. Ins. 4. t. 6. f. 3.*

*Cram. pap. 3. t. 29. f. B.*

Inhabits Asia.

Pl. 45.



## ORDER IV.

*NEUROPTERA.*

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THE Order Neuroptera is composed of insects with four naked, membranous, and reticulated wings. There is one exception however with respect to the number, the Ephemera having but two wings instead of four. The wings are in most instances nearly equal in size, that is, the first pair are hardly longer or broader than the second, though in some cases the lower pair are much the smallest; and in the Ephemera, as has been just observed, they are wholly wanting. For the most part they are very large, and widely extended; naked, or covered with fine scattered hairs, very different in their form and arrangement from the little close and imbricated scales, which entirely

cover the wings of the Lepidoptera. These hairs, where they exist, are placed more particularly along the nerves, which, by their disposition, give that peculiar reticulated or network appearance to the wings. It is well to observe the arrangement of the principal nerves, which pass from the base to the extremity of the wings, since they serve to mark the genera, being constantly disposed in the same manner, in the species of the same genus. This observation applies with equal force to the transversal nerves. They exhibit differences as remarkable, and as constant with respect to the genera, as those which run in a longitudinal direction.



GENUS XLVI. *LIBELLULA*.

## GENERIC CHARACTER.

*Antennæ* shorter than the thorax, setaceous.

*Mouth* armed with jaws, more than two in number. *Wings* extended. *Tail* in the male furnished with a kind of forceps.

*General Observations.*

This genus is divided by Linnæus into two families. In the first,

The wings, when at rest, are spreading out.

In the second,

The eyes are placed at a distance from each other, and the wings are erect.

Dr. Shaw observes, that the *Libellulæ* or Dragon-flies, sometimes called by the very improper title of Horse-stingers, exhibit an instance scarcely less striking than the butterfly, of that strange dissimilitude in point of form, under which one and the same animal is destined to appear in the different periods of its

existence. He adds, that perhaps few persons not particularly conversant in the history of insects would imagine that these brilliant and lively animals, which may be seen flying with such strength and rapidity round the meadows, and pursuing the smaller insects with the velocity of a hawk, had once been inhabitants of the water, and that they had resided for a long space of time in that element before they assumed their flying form.

The eggs, which the female drops into the water, sink to the bottom, and are hatched into very ugly larvæ, of a brown colour, with six feet. When advanced to the chrysalis state, the wings begin to appear on the back, and from their head projects a strong jointed arm, with a most formidable pair of forceps or prongs at the end. They are two years in passing from the egg to the perfect insect; during which time, from their voracity, their cruelty towards their companions, and the destruction they make amongst them, they have not unaptly been called the Crocodiles of aquatic in-



LIBELLULA.



*L. quadrimaculata.*

sects. When the chrysalis, which is in no degree less active than the larva, is about to be transformed, it creeps up the stem of a water-plant, and making an effort by which the skin is burst, slowly emerges from its sheath, which is left behind sticking to the plant. This is generally effected in the morning, and in the sun-shine, that the wings may be sooner dry, and as little time lost of the short comparative space allotted to the insect to skim the surface of the pools as possible. The change of the Libellula from one state of life to the other is striking. Deprive the larva of water, and it will die; plunge the perfect insect into the same element, and it will be as effectually destroyed.

## SPECIFICATION.

**LIBELLULA QUADRIMACULATA.** L. alis posticis basi omnibusque medio antico macula nigricante. *Linn. Syst. Nat.* p. 901. *Gmel.* p. 2619. *Fabr. Ent. Syst.* 3. p. 373. *Spec. Ins.* 1. p. 519. *Mant. Ins.* 1. p. 336.  
*Reaum. Ins.* 6. t. 35. f. 1, 2.

*Schaeff. Icon. t. 9. f. 13.*

*Panzer, Faun. Ins. Germ. fasc. 88. t. 19.*

Inhabits Europe, and is found about rivers and stagnant waters.

Pl. 46. a. One of the antennæ magnified.



GENUS XLVII. *EPHEMERA*.

## GENERIC CHARACTER.

*Antennæ* thin, setaceous, and shorter than the head. *Mouth* without mandibles. *Palpi* four, very short, nearly equal and filiform. *Stemmata* two, large, and situated above the eyes. *Wings* erect, the hind ones very small. *Tail* terminated by two or three setaceous filaments.

*General Observations.*

Of the two sections, into which Linnæus has divided this genus, the insects of the first have two, and of the second three bristles in the tail.

The Ephemera derives its name from its short and transient existence in its perfect state. Some of the species die the same hour they are born; others never see the sun, they burst through their filmy covering at the close of day, and die before the dawn. The term Ephemera is not strictly correct; for the existence of certain species is prolonged for two or three days; conse-

quently it designs a space of time too long for some, and too short for others.

The larva and the chrysalis are nearly alike; they have six feet, and six plumated fins on the sides of the abdomen, and range about beneath the waters for a year or two, before they emerge to become inhabitants of the air. In May or June the transformation happens. The chrysalis creeps to the shore, the skin bursts, the tender fly issues from the cavity, unfolds its wings, and launches into the air. Myriads are thus produced, and will cover the clothes of any person standing by a brook or pond, in a warm close evening in the month of June. The males have very little activity; they merely flutter above the surface of the water till they drop; and seem scarcely born for any other purpose than to die. Not so the females: they have an important duty to fulfil; a future generation depends on their exertions, and their short existence is occupied in depositing their eggs. Two large packets, each containing three or four hundred, are inclosed within the body of every female, from whence they



EPHEMERA.



*E. vulgata.*

are excluded at the same moment, and fall together in one mass upon the water. Providence, ever ready to supply deficiencies, where those deficiencies may prove injurious to its creatures, has provided this little insect with a couple of small bladders, which it has the power of filling with air immediately after the exclusion of the eggs. Without such provision, which gives it the means of restoring the equilibrium, a vacuum so suddenly formed, might prove fatal to the Ephemera.

## SPECIFICATION.

EPHEMERA VULGATA. Ep. cauda triseta, alis nebuloso-maculatis. *Linn. Syst. Nat.* 1. p. 906. *Gmel.* p. 2628. *Fabr. Ent. Syst.* 2. p. 68. *Spec. Ins.* 1. p. 383. *Mant. Ins.* 1. p. 243.

*Degeer, Ins.* 2. t. 16. f. 1.

*Schaeff. Icon. Ins.* t. 9. f. 5, 6.

*Panzer, Faun. Ins. Germ. fasc.* 94. t. 16.

Inhabits Europe. The larva is found in the water; the perfect insect in the trees and bushes on the banks.

GENUS XLVIII. *PHRYGANEÆ*.

## GENERIC CHARACTER.

*Antennæ* setaceous, longer than the thorax.

*Mouth* without teeth, but furnished with a horny, short, arched, acute mandible. *Palpi* four. *Stemmata* three. *Wings* incumbent, or laid horizontally on the body, the hinder ones folded.

*General Observations.*

This genus is divided into two sections :

1. With two setæ or threads in the tail.
2. With the abdomen simple, or without setæ.

The larvæ of the *Phryganææ* live in fresh water; they are of a lengthened shape, with six legs and a ringed body, and inhabit tubular cases, formed by themselves of pieces of wood, shells, particles of sand, &c. These cases, though rough without, are smooth within, being lined by the insect throughout with silk. There is one species in particular deserving of



notice, for the neatness with which it forms its case. It is made of the leaves of duck-weed, which is found in such abundance floating on the surface of the water. These leaves might do very well in their original shape; but the insect, dissatisfied with their appearance, cuts them into very regular square pieces, and joins them end to end, so as to form a spiral habitation, somewhat resembling a green ribbon rolled upon a cylinder. These larvæ in general are well known to fishermen by the name of Cadis, and are an excellent bait for many fish.

The larva prepares for the usual change by projecting its case a little above the surface of the water, and fixing itself by silken threads to a water-plant. In this state it becomes a chrysalis; and in about a fortnight or three weeks a winged and perfect insect.

## SPECIFICATION.

PHRYGANEÆ GRANDIS. P. alis cinereo-testaceis:  
lineolis duabus longitudinalibus nigris: puncto  
albo. *Linn. Syst. Nat.* p. 909. *Gmel.* p. 2633.

*Fabr. Ent. Syst.* 2. p. 76. *Spec. Ins.* 1. p. 389.

*Mant. Ins.* 1. p. 245.

*Roesel. Ins.* 2. *Aquat.* t. 17.

*Schaeff. Icon.* t. 109. f. 3, 4.

*Panzer, Faun. Ins. Germ. fasc.* 94. t. 18.

Inhabits Europe. Generally settles on the sides of walls, on the branches of trees, &c. in the shade. The larva inhabits a tube made of bits of bark, &c.

Pl. 48.

PHRYGANEÆ.



*P. grandis.*



GENUS XLIX. *HEMEROBIUS*.

## GENERIC CHARACTER.

*Antennæ* setaceous, projecting before the head, and longer than the thorax. *Mouth* with two teeth and four unequal filiform palpi. *Stemmata* none. *Wings* deflected, not folded as in the preceding genus. *Abdomen* simple. *Tarsi* with five articulations.

*General Observations.*

The eggs of the Hemerobii are deposited in groups on the leaves of a water-plant, on blades of grass at the edge of the water, or on trees in its neighbourhood. Their appearance is singular, each egg being supported on a slender footstalk, so that it resembles vegetable mould, or a very diminutive fungus. The larvæ when hatched are of an oblong oval shape, pointed at the end. They have six feet, and a short pair of curved forceps, with which they seize their prey. They feed almost entirely on Aphides, a weak race, without defensive arms, too slow in their motions to escape by flight, and

too stupid to do it if they could. These Aphides are abundant on the leaves of the same plant, and one of the active larvæ rushing among them, will suck the juices of a dozen in a few minutes. Notwithstanding the abundance of this food, and the facility with which it is procured, it often happens that, if two of these larvæ chance to meet, they will attack each other with ferocity, and the weakest must submit to be devoured by the conqueror. They increase so rapidly in size, that in about fifteen days they have attained their full growth, and are then three quarters of an inch long. When about to change into the chrysalis state, the animal spins a fine white silk from the end of its abdomen, which it fixes to a leaf or twig, and then continuing the operation, envelops itself completely, forming a silken case as round as a ball and not larger than a pea. It is difficult to conceive, how a body of so large a comparative size, can be made to occupy so small a space; but Nature is all sufficient! Soon after the case is finished, the larva is transformed into a chrysalis, and in about three





HEMEROBIVS.



*H. Chrysops*

weeks, sometimes sooner, issues the delicate and tender Hemerobius from its silken tomb.

## SPECIFICATION.

HEMEROBIUS CHRYSOPS. *H. viridi nigroque varius,*  
*alis hyalinis maculis reticulatis.* *Linn. Syst. Nat.*

1. *p.* 912. *Gmel. p.* 2640. *Fabr. Ent. Syst.* 2.

*p.* 83. *Spec. Ins.* 1. *p.* 393. *Mant. Ins.* 1. *p.* 247.

*Roesel. Ins.* 3. *App. t.* 21. *f.* 3.

*Degeer, Ins.* 2. *p.* 68. *t.* 22. *f.* 1.

*Schaeff. Icon. t.* 5. *f.* 7, 8.

Inhabits Europe, and is found in moist woods and shady places in summer. It is the *H. maculatus* of Olivier.

Pl. 49.

## GENUS L. MYRMELEON.

## GENERIC CHARACTER.

*Antennæ* short and thickening towards the end.

*Mouth* armed with mandibles, and jaws.

*Palpi* six. *Stemmata* none. *Wings* deflected.

*Tail* in the male, armed with forceps. *Tarsi* with five articulations.

*General Observations.*

The species of this genus resemble in some degree the *Libellulæ*, but are not, in general, so light or elegant. They couple in the summer, and the female deposits her oblong eggs in dry and shady places. From one of the species proceeds a larva, of which several Naturalists, especially Reaumur and Roesel, have given a particular and detailed account. The *Myrmeleon Formicarium*, or Lion-Ant, is an insect living by rapine, but in its larva state denied the power of pursuit. This want it supplies by stratagem, and selecting the driest sand it can meet with, forms a hollow like the cavity of a funnel, at the bottom of which the

wary insect lies concealed, with merely its pincers exposed above the surface. The sides of the trap are so very loose, that they give way and precipitate its prey to the bottom, from whence it stands but little chance of returning alive. The moment the Lion-Ant is apprized, by the falling of a few grains of sand, that something is in the pit, it rushes forward, seizes it with avidity, and, having plunged its forceps into its body, drags it under the sand to be devoured at leisure.

When preparing to change into the state of a chrysalis, the insect collects and agglutinates a quantity of sand into the shape of a ball, lining the inside with very fine pearl-coloured silk. It remains in this situation about a month, and is then changed into a light and most elegant fly, the very opposite to the uncouth ill-shaped creature from which it proceeded.

## SPECIFICATION.

MYRMELEON FORMICARIUM. *M. alis macula alba marginali postica.* *Linn. Syst. Nat. p. 914. Gmel. p. 2643. Fabr. Spec. Ins. 1. p. 399. Mant. Ins. 1. p. 249.*

*Reaum. Ins.* 4. t. 11. f. 6—8.

*Roesel. Ins.* 3. t. 17—20.

*Schaeff. Icon.* t. 22. f. 1, 2.

*Panzer, Faun. Ins. Germ. fasc.* 95. t. 11.

Inhabits Europe, and is found in sandy places.

Pl. 50. a. One of the antennæ magnified. b. The larva of the natural size with the forceps expanded.

MYRMELEON.



*M. Formicarium.*





GENUS LI. *PANORPA*.

## GENERIC CHARACTER.

*Antennæ* filiform, longer than the thorax. *Head* prolonged into a horny cylindrical snout, or proboscis, bearing the parts of the mouth at the end. *Palpi* four, nearly equal. *Stemmata* three. *Tail*, in the male only, with a chela, or claw, at the end.

*General Observations.*

The chief singularity in the conformation of the *Panorpa*, is to be found in its tail. From the last ring of the abdomen proceed two moveable fangs, which crossing each other at their extremity, form a pair of pincers, not unlike in shape and make to the thick claw of a lobster. The use of this singular appendage is not clearly ascertained. It is not, like the tail of the Scorpion, an offensive weapon; it contains no poison; and although carried in an upright and threatening position, is not used by the insect to seize its prey. As this apparatus is peculiar to the male, may not its use be con-

fined to its connexion with its mate? The head also is prolonged into a beak, that might lead us to suppose the insect robbed the nectaries of flowers, if we were not aware that its habits are carnivorous, that it lives by rapine, and that it feeds on small flies, and other dipterous insects.

The *Panorpæ* appear at the end of the spring and during the summer in meadows, in woods, and in moist and shady places. They avoid the heat of the sun; and although they have ample wings and strong muscles to put them in motion, they fly but to a short distance, and that seemingly with difficulty. Sometimes they will hardly take the trouble to expand their wings, but, upon the approach of danger, glide beneath the bushes, and conceal themselves from sight.

We have no knowledge of their larvæ, and cannot say whether they are aquatic, or live in the interior of vegetables, or seek their prey upon the surface of the earth.



PANORPA.



*P. communis*

## SPECIFICATION.

PANORPA COMMUNIS. Pa. alis æqualibus nigro maculatis. *Linn. Syst. Nat.* 1. p. 915. *Gmel.* 1. p. 2645. *Fabr. Syst. Ent.* 1. p. 313. *Spec. Ins.* 1. p. 400. *Ent. Syst.* 2. p. 97.

*Degeer, Ins.* 2. p. 36. t. 24. j. 3, 4.

*Schaeff. Icon.* t. 88. f. 7.

*Panzer, Faun. Ins. Germ. fasc.* 50. t. 10.

Inhabits Europe, and is found in moist and shady places, in the spring and summer.

Pl. 51. a. The rostrum or snout magnified. b. b. Antennæ. c. The cheliform tail.

GENUS LII. *RAPHIDIA*.

## GENERIC CHARACTER.

*Antennæ* filiform, as long as the thorax, the anterior part of which is elongated and cylindrical. *Mouth* with two teeth. *Palpi* four. *Head* depressed and horny. *Stemmata* three. *Wings* deflected. *Tail* of the female with a recurved lax bristle.

*General Observations.*

The *Raphidia* is remarkable for the size of its head, and its lengthened thorax, which, in the example selected for our plate, gives it a snake-like appearance. The genus is confined to a very few species, the habits of which are but little known. Of the larva we were quite ignorant, till Latreille, in the *Bulletin de la Société Philomathique*, described it as being very straight and long, of a mixed grey and black colour, with a scaly head and six feet. It resembles a small worm; is extremely vivacious, runs very quickly, and turns on all sides to insinuate itself the more readily into the crevices





## RAPHIDIA.

*R. ophiopsis*

of trees. Linnæus mentions the pupa of the *R. ophiopsis*, and says it is like the mother, except that it wants her wings.

SPECIFICATION.

RAPHIDIA OPHIOPSIS. *R. thorace cylindrico. Linn.*

*Syst. Nat.* 1. p. 916. *Gmel.* 2647. *Fabr. Spec. Ins.* 1.

p. 402. *Mant. Ins.* 1. p. 251. *Ent. Syst.* 2. p. 99.

*Roesel. Ins.* 3. *App. t.* 21. f. 6, 7.

*Schaeff. Icon. t.* 95. f. 12.

*Panzer, Faun. Ins. Germ. fasc.* 50. t. 11.

Inhabits Europe, and is found in England, but rarely, in gardens and pine-forests. In certain years it is very common in the woods about Paris, preying upon the lesser insects.

Pl. 51. a. The head and thorax magnified. b. A horn. c. A hind leg.

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## ORDER V.

*HYMENOPTERA.*

**T**HE Hymenoptera have four transparent, membranous wings, of unequal size; the two inferior being always much the smallest. All the wings are strongly marked with longitudinal nerves, but the transversal nerves are not so evident. While the Hymenoptera are flying, the wings are extended on the same plane, and are strongly united by means of several little hooks, which are not visible without the help of the microscope. This union is effected by hitching the internal edge of the upper wing to the external edge of the lower, so that the wings never separate during flight; but seem, as it were, formed of a single membrane. The mouth also is a character of consequence in

the insects of this order, and is sometimes armed with strong jaws, calculated for gnawing and biting with considerable force. Most of them, in the room of jaws, have a sort of trunk, with which they extract the honeyed liquor from flowers, or fruits. This organ is very apparent in some genera, but in others it is very minute. It should be noticed that, independent of two large, reticulated eyes, the Hymenoptera have on the upper part of the head, three little shining specks or stemmata, probably placed there for the purpose of sight, and disposed in a triangle. We observe some insects of this order that have no wings, and which never obtain any. Such are to be found in the genus *Formica* and *Mutilla*; but then they are the neuters, or mules; the males and females are never wingless.

## GENUS LIII. CYNIPS.

## GENERIC CHARACTER.

*Antennæ* cylindrical, moniliform. *Mouth* armed with jaws, but no proboscis. *Palpi* four, short, unequal, and capitated. *Sting* spiral, and contained within the body.

*General Observations.*

It is the species of this genus that produce those vegetable excrescences known by the name of galls. These galls are of various figures and sizes. Some are round like small apples, some are isolated; others again are in clusters; many are of an irregular figure, and are occasionally bristled with little fibres. Each particular species of Cynips seems to form an excrescence of its own, which deviates in some respects from the rest, but that of all others the most interesting on account of its utility, is the oak-gall, produced by the *C. Quercus-folii*.

When the female Cynips is desirous to lay

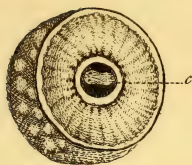


her eggs, she pierces the leaf of the oak with the needle or borer at her tail, and deposits an egg in each puncture. The wounds thus made, in a few days begin to swell, and increase from July to September, when they have attained their full size, as represented in the upper part of plate 53. Upon opening one of these galls, we find in the centre a small larva snugly seated, in a cavity perfectly round, and generally rolled into the shape of a ball. In September it becomes a chrysalis, and in about three weeks after gnaws its way through the gall, and issues a perfect insect, leaving that small round hole which is to be seen in every nut. The Galls used in the arts are chiefly imported from the Levant, and are much stronger than what arise from the Oak of this country.

## SPECIFICATION.

CYNIPS QUERCUS-FOLII. *C. nigra*, thorace lineato, pedibus griseis, femoribus subtus nigris. *Linn. Syst. Nat.* 1. p. 918. *Gmel.* 1. p. 2650. *Fabr. Ent. Syst.* 2. p. 101. *Spec. Ins.* 1. p. 403. *Mant. Ins.* 1. p. 252.

CYNIPS.



*C. Quercus folii.*



*Reaum. Ins.* 3. t. 39. f. 14—17.

*Roesel. Ins. App. t.* 52, 53.

Inhabits Europe.

Pl. 53. a. Natural size. b. Magnified. c. The  
gall-nut opened to show the included larva.

GENUS LIV. *TENTHREDO*.

## GENERIC CHARACTER.

*Mouth* with jaws, but no proboscis. *Palpi* four, unequal and filiform. *Wings* extended, swelled or slightly inflated. *Sting* with two serrated, or saw-like laminæ, nearly hidden within the abdomen. *Scutellum* with two small distant tubercles.

*General Observations.*

The great variation in the formation of the Antennæ of the Tenthredines, has induced Lin-næus to divide them into the following families, founded upon that circumstance :

1. With the antennæ club-shaped.
2. With the antennæ not articulated, but of one continued thread.
3. With pectinated antennæ.
4. With the antennæ somewhat club-shaped and articulated, or jointed.
5. With filiform antennæ, having seven or eight articulations, besides the base.

6. With setaceous antennæ, composed of several articulations.

The instrument which the female Tenthredo uses to deposit her eggs, is contained between two scaly laminæ, or grooves, at the end of the abdomen. She can exert it at pleasure; and, being serrated, it serves her as a gimblet or borer, with which she is enabled to penetrate the outer bark of vegetables.

A familiar example may be met with in the *T. rosæ*, the female of which may be seen in a fine summer morning, about ten o'clock, running with eagerness over all the branches of the rose, and generally selecting that which is near the extremity of the principal stem. Here she makes an opening with her borer, and when she considers the hole of a proper size, deposits an egg in the cavity. She then remains perfectly quiet for some minutes, with the borer still in the hole; after this pause she partly withdraws the instrument, and in the act emits a frothy liquor which fills the cavity. The use

of this liquor is not well understood, but as soon as it is emitted, the insect wholly withdraws her borer, to repeat the operation in another place. Of these holes, she will make from four to twenty by the side of each other. That part of the rose-branch where the deposition has been effected, begins to turn brown on the following day, and the wounds it has received begin to rise and increase in convexity from day to day, till in due time the enclosed egg gives birth to a larva, which bursts its green covering, to seek its food on the surface of the rose-leaf.

The larvæ of the Tenthredines bear a strong resemblance to caterpillars, but have a greater number of feet. They inhabit different trees according to their species; and some of them exhibit in their economy, peculiarities deserving of notice. The larvæ of the *Tenthredo pini* live in society on the pine-tree. Their company frequently amounts to a hundred; and when they have consumed all the leaves of the branch they have selected, the whole colony with one





TENTHREDO.



*T. Caprea.*

consent march off in search of another, where they can again satisfy their appetite. They do not confine themselves to the leaves only, but also bark the young shoots of the pine. When touched they exude from their mouth a drop of clear resinous juice, which has the consistence and aromatic smell of that which issues from the tree when wounded.

Nearly all the species towards the end of summer enclose themselves in a double case, in which they remain, many of them, all the winter, before they change into the chrysalis state. In about a fortnight or three weeks after the change, the perfect insects appear.

## SPECIFICATION.

TENTHREDO CAPRÆ. *T. Salicis*. *Linn. Syst. Nat.* 1. p. 928.

*T. flava capite, thorace abdomineque supra nigris, alis puncto flavo.* *Linn. Syst. Nat. Gmel.* 1. p. 2663.

*Fabr. Spec. Ins.* 1. p. 414. *Mant. Ins.* 1. p. 255.

*Ent. Syst.* 2. p. 118.

*Reaum. Ins.* 1. t. 1. f. 18. and 5. t. 11. f. 5, 6.

*Panzer, Faun. Ins. Germ. fasc.* 65.

Inhabits the willow, and currant bushes. The larva, which is blue and fulvous, with nine rows of black spots, is very destructive to the gooseberry and red currant bushes.

Pl. 54. a. Natural size. b. The same magnified. c. One of the antennæ enlarged.

GENUS LV. *SIREX*.

## GENERIC CHARACTER.

*Antennæ* filiform, with more than 24 articulations. *Mouth* armed with two strong jaws. *Palpi* four, the hind ones the longest; thick towards the tip. *Sting* projecting, strong, stiff, and serrated. *Abdomen* slender and terminating in a point or spine, from which the sting projects. *Wings* lanceolate, or pointed at the extremities, flat, not folded.

*General Observations.*

The larvæ of these insects live in decayed vegetables. They have six feet, and are soft and of a cylindrical shape. The chrysalis enclosed in a case, resembles the perfect insect, with the limbs in a contracted state, and without wings. The sting of the *Sirex* is formidable; and one in particular, the *Sirex Spectrum*, which is very vigorous, and is found in putrid wood, especially of the pine and fir, is said to sting with such force, as to pierce one's

finger to the bone. The largest of the genus is the *Sirex Gigas*, which often exceeds the size of the one represented in pl. 54. It is chiefly among cone bearing-trees, and has a very conspicuous sting, or terminal tube. With this sting the female perforates the fir-trees, and deposits her eggs in clusters, sometimes to the number of two or three hundred. The larva is above one inch long, and not unlike a yellow grub in appearance, but has a short black spine at the end of the abdomen. It feeds in the body of the tree, changes to a chrysalis in July, and in three weeks time becomes a winged insect. Some of them change late in the season, and remaining all the winter shut up, emerge from their case the following spring.

## SPECIFICATION.

SIREX GIGAS. S. abdomine ferrugineo; segmentis 3, 4, 5, 6, nigris, thorace villosa. *Linn. Syst. Nat.* 1. p. 928. *Gmel. p.* 2671. *Fabr. Spec. Ins.* 1. p. 418. *Mant. Ins.* 1. p. 257. *Entom. Syst.* 2. p. 124.  
*Roesel. Ins.* 2. *Vesp. t.* 8, 9.

SIREX.



*S. gigas.*





*Schaeff. Icon.* 10. t. 2, 3.

—— *Elem.* t. 13. f. 7.

*Klug. Monogr. Siric. Germ. pl.* 2. f. 1.

Inhabits Europe, and is found in coniferous trees.

Pl. 55.

GENUS LVI. *ICHNEUMON*.

## GENERIC CHARACTER.

*Antennæ* filiform, or setaceous, with more than thirty articulations. *Mouth* armed with jaws, without any tongue. *Palpi* four. *Abdomen* in most species joined to the body by a pedicle, or stalk. *Sting* projecting, and enclosed in a cylindrical sheath composed of two valves.

*General Observations.*

The following are the Linnæan divisions of this genus:

1. With the scutellum white, and the antennæ with a white ring.
2. With the scutellum white, and the antennæ wholly black.
3. With the scutellum of the same colour as the thorax, and a white ring on the antennæ.
4. The same as the preceding, but the antennæ black and setaceous.
5. With the antennæ yellow and setaceous.

6. The species of this division are very small, and have filiform antennæ, with the abdomen oval, and not joined to the thorax by a pedicle.

Instinct leads the different species of this numerous genus to provide for their future progeny in a manner distinct from each other. Some lay their eggs in the crevices of walls; others insert their long borers into the clefts of trees, and there deposit their burden; while a third division, and that the most singular in the adoption of its object, singles out an unlucky caterpillar, and the female Ichneumon plunging her long tube into its body, introduces egg after egg, and notwithstanding all the attempts of her victim to rid itself of its tormentor, continues her operation till her whole stock of eggs is deposited. The numerous larvæ, which originate in the body of the caterpillar from the eggs thus laid, and which live at its expense, and feed on its substance, do not, as one might reasonably suppose, destroy the animal directly, but carefully avoiding the immediate destruction

of that, which would at the same time be death to themselves, they leave the vital parts and principal viscera untouched, feeding only on that fatty substance with which the body of the caterpillar is plentifully provided. This substance furnishes nourishment enough for the larvæ to exist till they have attained their full size; and when they are ready for their usual transformation they pierce the skin of the caterpillar with their teeth, and creeping out in various places spin themselves a silken covering, in which they pass the chrysalis state. In the mean time the languid and shrivelled caterpillar, with its body like a sieve, after having yielded all its substance to its parasitical companions, is in a short time relieved from its sufferings by death.

The insects of this genus are for the most part remarkable for the continued vibration of their antennæ.

#### SPECIFICATION.

ICHNEUMON MANIFESTATOR. Ich. corpore atro immaculato, abdomine sessili cylindrico, pedibus rufis. *Linn. Syst. Nat.* 1. p. 934. *Gmel.* p. 2691.

ICHNEUMON.



*I. manifestator.*



*Fabr. Spec. Ins.* 1. p. 430. *Mant. Ins.* 1. p. 265

*Ent. Syst.* 2. p. 162.

*Reaum. Ins.* 6. t. 29. f. 16.

*Degeer, Ins.* 1. t. 36. f. 9.

*Schaeff. Icon.* t. 10. f. 3.

*Panzer, Faun. Ins. Germ. fasc.* 19. t. 21.

Inhabits Europe, and is found in woods.

Pl. 56. The figure is somewhat larger than the usual

size.

GENUS LVII. *SPHEX*.

## GENERIC CHARACTER.

*Antennæ* filiform, with 10 articulations. *Mouth* armed with jaws, but no tongue. *Palpi* four. *Wings* extended and incumbent in both sexes. *Sting* short, pointed, and concealed within the abdomen.

*General Observations.*

This genus is divided into two families :

1. With the antennæ filiform, and the abdomen connected to the thorax by a pedicle, or stalk.
2. With the antennæ filiform, but the abdomen sessile, or joined to the thorax without the intervention of a pedicle.

The Spheges live entirely on the honey of flowers. The females may be seen flying from place to place in search of a proper situation to form their nest, and at times making a humming noise, which is supposed to be a mark of



some particular affection. The insect chooses a dry and sandy situation exposed to the sun, where it forms a nest for the preservation of its posterity. In digging the hole the Sphex uses its mouth and feet, carrying away with its teeth the grains of sand, and throwing to a distance the particles of earth with its hind-feet, which are then in continual motion, and resemble the action of a hen while scratching the ground in a hot summer day. With great labour the insect at length makes a hole some inches deep, and carried in an oblique direction from the surface of the ground. This operation may be easily watched, as the nest is generally formed by the way-side. When the business is completed, the female seeks for a spider or caterpillar, which it kills with its sting, and having dragged it into its hole, deposits an egg in the body. The mouth of the nest is then carefully closed by the insect with earth, and the larva thus provided with food till the time of its change.

The female of the American Sphex, *Sphex*

*Pensylvanica*, which is a large insect an inch and a quarter long, proceeds in the same way with its nest, but provides its progeny with grasshoppers only. They are of the large green kind; three of which at different times are dragged to the nest, an egg laid in the body of each, and the mouth of the hole closed upon them. These insects use a cruel precaution with the grasshoppers, that their larvæ may not find them putrid when they issue from the egg. They wound them, but in such a manner that they may exist for some days after being buried.

The sting of the *Sphex* is sharp, but does not cause the same inflammation as that of the wasp or bee.

#### SPECIFICATION.

SPHEX FIGULUS. *S. atra*, abdomine subpetiolato: marginibus segmentorum lucidis. *Linn. Syst. Nat.* 1. p. 942. *Gmel.* p. 2727. *Fabr. Spec. Ins.* 1. p. 444. *Mant. Ins.* 1. p. 274. *Ent. Syst.* 2. p. 202. *Panzer, Faun. Ins. Germ. fasc.* 80. t. 16.  
Inhabits Europe. At Upsal makes its nest in the

SPHEX.



*S. figulus.*



holes of wooden partitions abandoned by other insects, placing a piece of moist clay at the bottom, and sticking a spider upon it. After depositing its egg in the spider's body, closes up the entrance with clay, and leaves it to be devoured by the larva.

Pl. 57. a. Natural size. b. The same magnified.

GENUS LVIII. *CHRYSIS*.

## GENERIC CHARACTER.

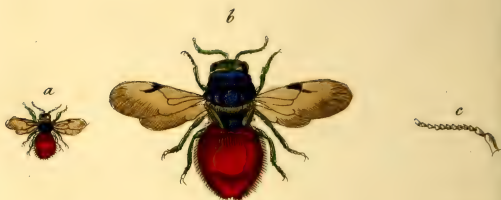
*Antennæ* filiform, with eleven articulations, the first long in proportion to the others. *Mouth* armed with jaws, no proboscis. *Palpi* four, unequal, and filiform. *Abdomen* arched beneath with a lateral scale on each side, and dentated at the end. *Wings* extended, not folded as in the wasp. *Body* of a shining colour, appearing as if gilt. *Sting* hid within the abdomen.

*General Observations.*

What has been said relative to the Ichneumon and Spheg, will apply for the most part to the Chrysis; their habits and metamorphosis being much the same. The Chryses are however far more beautiful insects, and are in general distinguished by the most brilliant metallic colours. They are generally seen in the hottest part of a summer day flying about walls, or near decayed wood, in the crevices of which



CHRYSID.



*C. aurata.*



the female deposits her eggs. Their movements are lively, and their flight rapid.

## SPECIFICATION.

CHRYSEIS AURATA. C. glabra nitens, thorace viridi, abdomine aureo, ano bidentato. *Linn. Syst. Nat.* 1. p. 948. *Gmel.* p. 2746. *Fabr. Spec. Ins.* 1. p. 456. *Mant. Ins.* 1. p. 284. *Ent. Syst.* 2. p. 242.

*Schaeff. Icon.* t. 42. f. 5, 6.

*Panzer, Faun. Ins. Germ. fasc.* 51. t. 8.

Inhabits Europe, and is found about walls. This species varies considerably in size.

Pl. 58. a. The natural size. b. The same magnified.  
c. One of the antennæ.

GENUS LIX. *VESPA*.

## GENERIC CHARACTER.

*Antennæ* filiform, increasing in size towards the end. *Mouth* armed with jaws, no tongue. *Palpi* four, unequal, and filiform. *Eyes* like a crescent. *Upper wings* plaited. *Body* smooth. *Sting* concealed within the abdomen.

*General Observations.*

Wasps build their upright oval nests of bits of wood and glue. The males are employed to collect the wood from the frames of windows, and from old posts and rails. They use their strong jaws to cut the wood, and carry away the saw-dust with their feet, making it into a mass at the nest, with a glutinous liquor which falls from their mouth. The nest is twelve inches or more in diameter, and is formed of several horizontal stages of hexagonal cells. The substance of the nest, after being kneaded and worked by the industrious inhabitants, is very like coarse whitish-brown paper. In each

cell the female deposits an egg, which is hatched into a larva or maggot. These larvæ are fed by the labouring wasps with a kind of honey, but very inferior to that of the common bee. The mothers attend to them with the greatest assiduity, and it is interesting to observe with what activity they visit the cells one after another, feeding each larva as they go along. When the larvæ are become large enough to fill their respective cells, they close up the mouth by spinning a very fine silken web, pass into the chrysalis state, and after a certain period, emerge in their perfect form. The males have no sting, and are not numerous; the females are but very few, but the neutral or labouring wasps abound, and compose nearly the whole of every swarm. They lay up no store of honey for the winter, and most of them perish in the cold season. The few that survive lay the foundation of a new colony in the spring, which by the month of July is raised to a full and healthy swarm.

## SPECIFICATION.

VESPA VULGARIS. V. thorace utrinque lineola interrupta, scutello quadrimaculato, abdominis incisuris punctis nigris distinctis. *Linn. Syst. Nat.* 1. p. 949. *Gmel.* 1. p. 2750. *Fabr. Spec. Ins.* 1. p. 459. *Mant. Ins.* 1. p. 287. *Ent. Syst.* 2. p. 256.

*Reaum. Ins.* 6. t. 12. f. 7, 8.

*Degeer, Ins.* 2. t. 26. f. 7.

*Schaeff. Elem.* t. 130.

Inhabits Europe, and makes its nest in the ground.

Pl. 59. a. The head magnified. b. b. The jaws, within which are seen the four unequal palpi. c. A horn.

VESPA.



*V. vulgaris.*



GENUS LX. *APIS*.

## GENERIC CHARACTER.

*Antennæ* filiform and short. *Mouth* armed with jaws, and having an inflected proboscis enclosed in a bivalve sheath. *Palpi* four, unequal, and filiform. *Wings* flat or without plaits. *Sting* in the females and neuters, concealed within the abdomen. *Tarsi* with 5 articulations, the first very long.

*General Observations.*

The bees which compose a hive are generally very numerous. Of the females there are rarely two, and never three; of the males from two to nine hundred and more; and of the neuters not less than fifteen or sixteen thousand. The three different kinds may be easily distinguished. The males, or drones, by their being larger and more downy than the neuters, or workmen. Their head is larger and rounder; their eyes also are larger, their trunk is shorter they have no sting, and the hind feet have not the rows of hair observable in the workmen:

The working bees are smaller, and have a longer trunk than the males ; their feet are furnished with several rows of short, close, and rough hairs, and they are armed with a sting. The female is remarkable for her size, which is nearly double that of the male : her body is more elongated ; she has a shorter trunk than the workmen ; the hind feet have not the rows of hairs which we observe in the others, and she has a very sharp sting. Upon opening a female the ovaria will be found to contain a quantity of eggs, more or less according to the season.

The history of the habits, manners, and economy of this industrious race, has occupied the pens of different writers till the subject is exhausted ; but it still remains a doubt with naturalists, to what particular country the wild bee, as a native, ought to be referred. Some have fixed their origin in the vast forests of Muscovy and the North, where they colonize in hollow trees and clefts of rocks. It is certain, that in Italy, in almost the whole of Asia, and even in the southern provinces of France, wild bees are often found : and it is probable



they exist in Africa, since some travellers have found honey at Madagascar of a green colour, and very agreeable taste, but much thinner than ordinary.

The Humble-bees, which form a considerable division of this numerous genus, may be distinguished at once by their size, and by their body being covered with thicker and longer hair than the smaller kinds. They live in small societies, from 30 to 50, never exceeding a hundred. They for the most part make their nest in the ground, or under moss, &c. forming cup-shaped cells, in which they deposit their eggs. The *Apis lapidaria* makes its nest in gravelly places, while the *Apis centuncularis*, or carpenter-bee, forms its tubular cavities in the body of a tree, and lines them with rose-leaves. The *Apis terrestris* is one of the largest of the species; the males are somewhat smaller than the females, and the neuters are much less than either. They live in society, and range from flower to flower, collecting the honey with great assiduity. Mr. Kirby, in his inestimable Monograph of English Bees, says that he has

often been amused at the time of the sycamores being in flower, with seeing these insects, busily engaged upon its very summit in collecting honey and pollen from its blossoms, and making a hum that might be heard at a considerable distance; and this even after sun-set. He observes that they are as alert in the morning, and he has frequently seen them at work in his garden, when the gooseberry was in blossom, before seven o'clock.

## SPECIFICATION.

APIS TERRESTRIS. A. hirsuta, nigra, thoracis cingulo flavo, ano albo. *Linn. Syst. Nat.* 1. p. 960. *Gmel.* 1. p. 2781. *Fabr. Spec. Ins.* 1. p. 475. *Mant. Ins.* 1. p. 299. *Ent. Syst.* 2. p. 317.

*Reaum. Ins.* 6. t. 3. f. 1.

*Schaeff. Elem.* t. 20. f. 6.

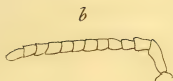
—— *Icon.* t. 69. f. 7.

*Panzer, Faun. Ins. Germ. fasc.* 1. t. 16.

Inhabits Europe. Is very common, and constructs its nest of moss under ground.

Pl. 60. a. The head enlarged, with the antennæ projecting. b. A horn magnified.

APIS.



*A. terrestris.*



GENUS LXI. *FORMICA*.

## GENERIC CHARACTER.

*Antennæ* filiform, elbowed. *Palpi* four, unequal. *Mouth* armed with large jaws, an upright scale between the thorax and abdomen. *Sting* confined to the females and neuters, and concealed within the abdomen. Males and females winged, neuters apterous.

*General Observations.*

Of this industrious race there are three distinct kinds, the males, the females, and the neuters. They differ in several particulars, and especially in their size; the females are the largest, the neuters, in general, the smallest, and the males seem to hold a middle place between the two. The labour of the ant-hill falls entirely upon the most numerous class, the neuters, while the males and females seem to have little more to do than to sleep and propagate. After the female has laid her eggs she seems to consider herself as acquitted from all

further trouble ; the care of the larva, a little scaly-headed worm without feet, being committed entirely to the neuters, whose affection for a progeny, which they have had no share in begetting, cannot be sufficiently admired. They work incessantly in their behalf, either in providing them with food, or carrying them daily in fine weather from the interior to the outside of the hill, that they may benefit by the influence of the sun. About the preservation of the chrysalis, which is contained within an egg-shaped cone of white silk much larger than themselves, they are extremely solicitous, and may be seen in the greatest confusion when a nest is disturbed, running in all directions, not to save themselves, but their charge. Till the moment when the final change takes place, they are constantly employed in the preservation of the chrysalids, carefully exposing them to the warmth of the sun in fair weather, and defending them with equal solicitude from the humidity of a wet season.

Their persevering industry is proverbial ; they are never disheartened by the magnitude of

their undertaking, but prove, by their constant and active exertions, how few difficulties there are which may not ultimately be overcome. When one of these little creatures has tried its utmost efforts to drag towards the magazine a mass of provision too large for its strength, another will come to its assistance, or more if necessary, till at length by the division of labour the task is accomplished.

It is commonly in the month of May or June, and sometimes even earlier, that the transformation of the larva to the chrysalis takes place, and in July the perfect insect appears. This appearance, however, cannot take place without the assistance of the working ants, who gnaw a sufficient opening in the cone for the passage of the insect, without which the helpless chrysalis would infallibly perish. An instance of the unusual early appearance of the perfect insect, and the bustle attending the circumstance, is thus mentioned by Degeer.

In the beginning of the month of May, and in the middle of a fine day when the sun was



shining in all its lustre, he visited an ant-hill, and found the colony in full action. A vast number were walking in the neighbourhood, and on the surface of the nest, insomuch that it was almost entirely covered, while many others climbed upon the trunks and branches of pine-trees, returning to and from the nest with as much bustle and activity as in the warmest day of summer. Attentive in his observation, Degeer all at once perceived in the midst of them a large winged ant which he found surrounded, and, as it were, hid by the workmen. He was the more surprised at this discovery, as he hardly expected to find a winged ant so early in the season.

## SPECIFICATION.

FORMICA RUFA. F. thorace compresso, toto ferrugineo, capite abdomineque nigris. *Linn. Syst. Nat.* 1. p. 962. *Gmel.* 1. p. 2798. *Fabr. Spec. Ins.* 1. p. 489. *Mant. Ins.* 1. p. 308. *Ent. Syst.* 2. p. 351.  
*Degeer, Ins.* 2. p. 305. *t.* 14. *f.* 1, 2.



FORMICA.



*F. rufa.*



*Schaeff. Elem. t. 64.*

———— *Icon. t. 5. f. 3.*

Inhabits Europe, and is found in fields and woods.

It makes its nest in the ground.

Pl. 61. a. The winged ant. b. The neuter. c. One of the antennæ.

GENUS LXII. *MUTILLA*.

## GENERIC CHARACTER.

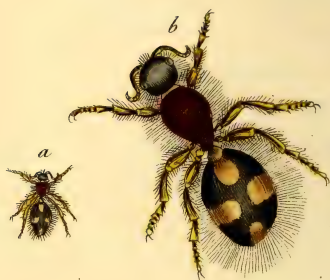
*Antennæ* filiform. Three shining eyes in the male. *Mouth* horny, with strong jaws, and a projecting lip, with four unequal palpi at the end. *Wings* for the most part wanting. *Body* downy. *Thorax* hollowed behind. *Sting* concealed.

*General Observations.*

A few of the insects of this genus have four unequal, veined wings, and these, by some, are supposed to be either males or females, while those without wings are thought to be neuters; thus bearing a strong affinity in their divisions to the genus *Formica*. This opinion, however, has been set aside by Latreille, who has ascertained that all the winged insects are males, and those without wings females. Very little is known respecting the history of the *Mutillæ*. The apterous species are found in the summer in sandy places running on the ground, and burying themselves in their holes,



MUTILLA.



*M. maura.*

which they dig to a considerable depth. The winged Mutillæ are much more difficult to find, and generally frequent flowers, but are too quick in their motions to be taken without great address.

## SPECIFICATION.

MUTILLA MAURA. *M. nigra*, abdomine maculis quatuor albis, thorace rufo. *Linn. Syst. Nat.* 1. p. 967. *Gmel.* p. 2806. *Fabr. Ent. Syst.* 2. p. 369. *Syst. Piezat.* p. 431.

*Coqueb. Illust. Ins.* 2. p. 67. t. 16. f. 7.

*Panzer, Faun. Ins. Germ. fasc.* 46. t. 18.

Inhabits Europe, and is found in Germany and the South of France.

Pl. 62. a. Natural size. b. The same magnified.





## ORDER VI.

*DIPTERA.*

THE insects of this Order, as the name implies, have two wings only. These are thin, membranous, transparent, and nervous. On the wings of the gnat we may perceive, by the aid of a magnifier, some little scales similar to those on the wings of butterflies and moths, but much smaller, and disposed in the direction of the nerves only. In the Order Diptera the wings are generally placed horizontally on the body of the insect, one covering the other, in-somuch that they cross and hide the abdomen. In some genera, however, they are differently situated, and leave the body quite exposed. There is one very striking particular observable

in this Order of insects, and which would alone distinguish it from every other. It is the poiser, or balancer; a little ball fixed to the end of a slender stem, which is itself attached under the origin of each wing. It seems a provision of Nature to compensate for the want of the second pair of wings, and by its quick and lively action, while the insect is in flight, to keep the body in a due state of equilibrium. It is to the dipterous insect, what the loaded pole is to the rope dancer. In the *Tipulæ*, and *Culices*, these balances are large and apparent; in other genera they are small and concealed.

GENUS LXIII. *OESTRUS*.

## GENERIC CHARACTER.

*Antennæ* very short, setaceous, and triarticulate.

*Mouth* a simple orifice, without trunk or apparent palpi. *Wings* variable. *Body* downy.

*Tail* inflected.

*General Observations.*

The manners of this tormenting genus of insects will be sufficiently illustrated by an attention to the type chosen in the plate of the *Oestrus Equi*. Other species differ in the choice of their residence during the larva state. The ox, the sheep, and, according to Bruce, the camel, and even the elephant and rhinoceros are subject to the attacks of this persevering fly. Mr. Bracy Clark, to whom we are indebted for a very scientific and interesting account of this genus, says, that when the female of the Horse Gad-fly (*Oestrus Equi*) has been impregnated, and the eggs are sufficiently matured, she seeks among the horses a subject for her purpose, and approaching it on the wing,

holds her body nearly upright in the air, and her tail, which is lengthened for the purpose, curved inwards and upwards: in this way she approaches the part where she designs to deposit her egg; and suspending herself for a few seconds before it, suddenly darts upon it, and leaves her egg adhering, by means of a glutinous secretion, to the hair. This operation is repeated by various flies of the same kind, till four or five hundred eggs are sometimes placed on one horse. After the eggs have remained on the hairs four or five days they become ripe; and if at this time, the horse in licking itself touches the egg, its operculum is thrown open, and a small active worm is produced, which adhering to the surface of the tongue is conveyed with the food into the stomach. These larvæ, says Mr. Clark, attach themselves to every part of the stomach, but are generally most numerous about the pylorus; and are sometimes, though much less frequently, found in the intestines. They have two small hooks at the lesser end, with which they fix themselves, commonly in clusters, to the inner membrane of



ŒSTRUS.



*Œ. Equi.*

the stomach. The larvæ attain their full growth by the end of May, and continue dropping from the horse the whole of June. As soon as they reach the ground, they find out some convenient retreat, and change to the chrysalis, and in about six or seven weeks the fly appears.

## SPECIFICATION.

OESTRUS EQUI. Oe. alis albidis, fascia punctisque duobus nigris, abdomine toto ferrugineo. *Fabr. Syst. Antl. p. 228. Clark, Trans. of the Linn. Soc. 3. p. 326. t. 23. f. 8, 9.*

Oestrus Bovis. *Linn. Syst. Nat. 1. p. 969. Gmel. 1. p. 2809.*

Inhabits Europe, and is found in pastures in the months of July and August.

Pl. 63. a. The male. b. The female. c. The larva.

GENUS LXIV. *TIPULA*.

## GENERIC CHARACTER.

*Antennæ* filiform. *Mouth* arched over by the upper jaw extended from the head. *Palpi* two, curved, equal, filiform, and longer than the head. *Proboscis* very short, and bent inwards.

*General Observations.*

Linnæus has divided this genus into two sections :

1. With the wings open or extended when at rest.
2. With the wings covering the body horizontally when sitting.

The *Tipulæ* are readily distinguished from other dipterous insects by the length and thinness of their bodies, by the extent of their wings, and by the length and slenderness of their legs, which seem hardly capable of supporting their bodies. Several of the smaller species bear a strong resemblance to the gnat; but a slight



examination of the mouth will suffice to show their difference, the trunk of the gnat being long and advanced, while that of the *Tipula* is very short and bilabiate.

The largest species of this genus may be seen in the meadows from the beginning of spring to the end of autumn. Although they rise high, they do not fly far, and at certain seasons they use their wings only to assist their legs in running. The smaller *Tipulæ* are continually in the air, flying up and down in swarms before the passenger, and making a slight humming noise like gnats, for which they are often, though improperly, mistaken.

The larvæ of the *Tipulæ* differ considerably in shape, and in the places they inhabit. Some are found under ground; some in the cavities of decayed trees, or in different species of Fungi; others in cow-dung; and one division inhabit the waters. Some of these last swim with great agility, while others quietly live in holes, which they make at the bottom or on the sides of rivulets.

When the female is desirous to deposit her

eggs in the ground, she makes use of two scaly pieces in the shape of pincers at the end of her abdomen. During the operation her attitude is very singular. She keeps her body in a vertical position, plunging her pincers into the earth; and having deposited by this means a single egg in the hole, she flies off to make another; and thus repeats the process, laying a single egg at a time, till the whole are discharged from her ovarium.

The *Agaricus quercinus*, whose leather-like substance is found attached to old pales, stumps, and decayed trees, feeds a larva of singular habits, which does not penetrate the substance of the plant, but lives beneath the gills. It has no feet, but a slimy skin, which leaves a trail behind it wherever it moves. It fixes itself to the fungus by a strong glutinous liquor, which it draws from its mouth, and applies in thin laminæ one against the other, attaching the ends to an opposite point; with the same it also forms a little roof for a shelter, so that, when completed, the retreat serves the purpose both of a bed and a tent. Seldom more than eight



TIPULA.



*T. pectinicornis.*

or ten of these larvæ are found on the largest Agaric. Towards the end of summer, the larva encloses itself in a case spun of the same matter with which it constructed its nest. The case is of a conical shape with a rough surface, and in this the chrysalis remains about a fortnight before the perfect Tipula appears.

The well known Gaffer Long-legs, so frequently seen in houses in the autumnal evenings, flying about the flame of the candles, and often perishing in the blaze, is the *T. rivos*a, one of the larger species of this genus.

## SPECIFICATION.

TIPULA PECTINICORNIS. T. antennis pectinatis, alis macula nigra, thorace flavescente. *Linn. Syst. Nat.* 1. p. 970. *Gmel.* 1. p. 2812. *Fabr. Spec. Ins.* 2. p. 399. *Mant. Ins.* 2. p. 321. *Ent. Syst.* 4. p. 233.

*Degeer, Ins.* 6. p. 400. t. 25. f. 3.

*Schaeffer, Elem.* t. 13. f. 8. & 129. f. 3.

———— *Icon.* t. 106. f. 5, 6.

Inhabits Europe, and is found in moist places.

Pl. 64.

GENUS LXV. *MUSCA*.

## GENERIC CHARACTER.

*Antennæ* short. *Mouth* with a short fleshy proboscis or trunk, which is retractile, bilabiate, and channeled. *Palpi* two, very short.

*General Observations.*

Linnæus has divided the *Muscæ* into the following families, founded on the form of their antennæ :

1. *Filatæ*. With simple antennæ, or without any lateral hair, or feather.

2. *Armataæ*. In which the antennæ have a lateral hair, or plume. These are subdivided into

*Tomentosæ* or *Pilosæ*.

The former have the body very slightly downy, and the antennæ are either

*Plumataæ*, feathered, or

*Setariæ*, with a simple lateral bristle.

The *Pilosæ* have a few hairs, chiefly on the thorax, and their antennæ are either *Plumata* or *Setariæ*.

“ In the morning of the ninth of September,” says Leeuwenhoek, “ I found 145 eggs laid as I judged by one fly. Some of these eggs, with a piece of dried flesh, I put into a glass, and carried in my pocket, the weather being cold, to see in what space of time maggots would be produced, and I found some of them the very same day. The next morning all the others were hatched ; and I found that, in one night, they had all grown twice the size of the eggs.”

The rapid multiplication of the fly is thus calculated by the same author. “ Let us suppose that in the beginning of June there shall be two flies, a male and female, and the female shall lay 144 eggs, which eggs in the beginning of July shall be changed into flies, one half males and the other half females, each of which females shall lay the like number of eggs ; the number of flies will amount to 10,000 : and



supposing the generation of them to proceed in like manner another month, their number will then be more than 700,000, all produced from one couple of flies in the space of three months."

The immediate organ of life lies in the thorax of the fly, independent of the head. A fly, while in the customary action of rubbing its fore-legs together, and passing them over its head, will not appear at the moment to miss that member, provided it be dexterously cut off at the neck, but will continue the same operation for some turns with its fore-legs, as if nothing had happened. The abdomen may likewise be crushed without killing the fly, but a squeeze on the thorax produces instant death.

Those phænomena, with which we are quite familiar, are apt to be totally disregarded. Nothing can be more difficult to conceive than an animal, in despite of gravity, running along the ceiling with the same ease as upon the floor; and yet this is daily performed by the fly with the greatest confidence, and daily witnessed by





MUSCA.



*M. meridiana.*

the observer with the utmost indifference. How this operation is effected we are still at a loss to determine. The foot of the fly, when highly magnified, shows two hairy soles united at the heel. These soles are flat, and are pressed upon by the fly whenever it moves. The requisite adhesion, which is obtained by the insect while walking upon a polished and perpendicular surface, has been referred to exhaustion; and that, as in the suckers of the *Remora*, or *Sepia*, a vacuum is formed, and the foot kept down by the external pressure of the atmosphere: but this conjecture will not hold, since we are assured by Hooke, in his *Micrographia*, that "they cannot make themselves so light as to stick or suspend themselves on the under surface of a glass well polish'd and cleans'd."

## SPECIFICATION.

MUSCA MERIDIANA. M. antennis plumatis pilosa nigra, fronte aurata, alis basi luteis. *Linn. Syst. Nat.* 1. p. 989. *Gmel.* p. 2838. *Fabr. Spec. Ins.* 2. p. 435. *Mant. Ins.* 2. p. 342. *Ent. Syst.* 4. p. 312. *Reaum. Ins.* 4. t. 26. f. 10.

*Schaeff. Icon. t. 108. f. 7.*

*Panzer, Faun. Ins. Germ. fasc. 10. t. 17.*

Inhabits Europe, and is common in woods.

Pl. 65. a. The head magnified. b. The antennæ.  
c. The trunk.

GENUS LXVI. *TABANUS*.

## GENERIC CHARACTER.

*Antennæ* short, the third articulation with a lateral tooth. *Mouth* extended into a fleshy proboscis, terminated by two lips. *Rostrum* having two awl-shaped palpi on each side, and parallel to the proboscis.

*General Observations.*

The Tabani are the chief tormentors of horses and cattle; during the summer they fasten upon their hides, and suck their blood with the greatest avidity. In the woods, in moist meadows, and near watery places, these insects are to be met with in the greatest abundance; and such is their thirst for blood, that they will follow a horse to a considerable distance, and sometimes even attack a man. When once engaged in their occupation, they may be taken off the hide of the animal without attempting to escape. This taste for blood is confined to the female sex; the males are perfectly innocent, and are satisfied with the honeyed juice, which, by the

help of their proboscis, they are enabled to extract from the nectaries of flowers. The activity of the males is by no means equal to that of the other sex ; they generally confine their flight to a small space, making several turns, and appearing, as it were, to invite the females to join them.

Of their larvæ little is known. Degeer is the only naturalist who has noticed that of the *T. bovinus*, which is of a yellowish white, with a cylindrical body divided into 12 rings, without feet, and having a scaly head armed with two large moveable fangs. It resides under ground in moist meadows, and changes into a brown chrysalis, having the abdomen fringed with long hairs. From this chrysalis in the space of a month the perfect insect proceeds.

#### SPECIFICATION.

TABANUS BOVINUS. T. oculis virescentibus, abdominis dorso maculis albis trigonis longitudinalibus. *Linn. Syst. Nat.* 1. p. 1000. *Gmel.* p. 2882. *Fabr. Spec. Ins.* 2. p. 455. *Mant. Ins.* 2. p. 354. *Entom. Syst.* 4. p. 363.

TABANUS.



*T. bovinus.*





*Reaum. Ins. 4. t. 17. f. 8.*

*Schaeff. Elem. t. 122.*

*Panzer, Faun. Ins. Germ. fusc. 2. t. 20.*

Inhabits Europe, is found in moist pastures, &c.  
and stings horses and cattle.

Pl. 66. a. The antennæ somewhat magnified. b. The  
two palpi. c. The rostrum.

GENUS LXVII. *CULEX*.

## GENERIC CHARACTER.

*Antennæ* setaceous; plumose in the male, hairy in the female. *Mouth* consisting of setaceous piercers within a flexible sheath. *Palpi* two, filiform, quadriarticulate, very long and hairy in the male, short and simple in the female.

*General Observations.*

The most troublesome species of this genus, the common Gnat, is well known to every one. Its approach is announced by the humming noise with which it troubles the silence of a summer-night; and its arrival by the sharp and venomous bite it inflicts upon our skin. Like many of the insect tribe, it enjoys successively those two kinds of life, which appear to be so diametrically opposite to each other. It is born in the water, but finishes its existence in the air. In the spring and summer, and even as soon as the ice is melted, the marshes, the ponds, and all the stagnant waters, exhibit the

small larvæ of the gnat, with their tails at the surface, and their heads beneath. These animals are very lively, and precipitate themselves to the bottom by the help of their little fins the moment they are approached. They return again, however, to their former position as soon as possible, on account of the organ of respiration, which is placed near the tail; and which is not calculated, like the gills of fish, to extract air from the water. When the larva becomes a chrysalis, this organ is multiplied, and its place is changed. Instead of one air-tube near the tail, we now find two upon the thorax, erect, like ears, with their open ends always above the surface of the water; the body at the same time is curled round, with the tail beneath the breast. In about ten days after becoming a chrysalis, the gnat prepares for its last transformation; the upper part of the body swells, the skin cracks, and the head of the insect appears above the surface of the water: the other parts by degrees follow through the same opening, till nothing is left behind but the tail. The gnat, during this operation, raises itself per-

pendicular, the deserted part of the sheath lies upon the water like a boat, while the body of the insect may be compared to the sail and mast. At this moment the animal is in considerable danger; for, should the slightest wind arise before the gnat can disengage itself, the water enters the boat, it sinks to the bottom, and the insect is infallibly drowned. Thus, in those days of transformation when the wind blows and the water is ruffled, thousands of gnats meet their death in that very element, without which, but a moment before, they could not have existed. When no such accident occurs, the body speedily dries, the tail is detached from the sheath, and the gnat flies into the air.

Instinct directs the fecundated female to return to the water, and prepare for the welfare of a future progeny, whose existence she will never live to witness. For this purpose she fastens herself by her four first feet to a floating leaf, or other substance, and crossing her hind legs, places in the angle thus formed, her first egg with the end of her tail, which in these in-

sects is remarkably flexible. She deposits successively her other eggs in the same manner, glueing them together, and giving them, with her feet, the form of a boat. This little vessel, which, when completed, consists of 2 or 300 eggs, placed with the utmost regularity by the side of each other, with their points upwards, has a head and a stern, and in fine weather floats securely upon the water. It is absolutely necessary that the eggs should float upon the surface till they are hatched (which happens in three or four days); for if by any chance the vessel should be wrecked, the larvæ will never be produced.

As one generation succeeds another in the course of a month, we may reckon upon six or seven in the year; insomuch that we should be buried in a cloud of gnats, if it were not for the accidents which happen to them by water, and for the birds, and a multitude of carnivorous insects, which prey upon them by land.

## SPECIFICATION.

CULEX PIPIENS. *C. cinereus*, abdomine annulis

VOL. II.

K

fuscis octo. *Linn. Syst. Nat.* 1. p. 1002. *Gmel.*  
p. 2886. *Fabr. Spec. Ins.* 2. p. 469. *Mant. Ins.* 2.  
p. 363. *Ent. Syst.* 4. p. 400.

*Reaum. Ins.* 4. t. 43, 44.

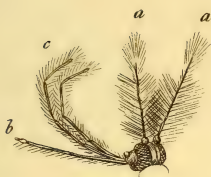
*Roesel. Ins.* 3. t. 15.

*Schaeff. Elem.* t. 54.

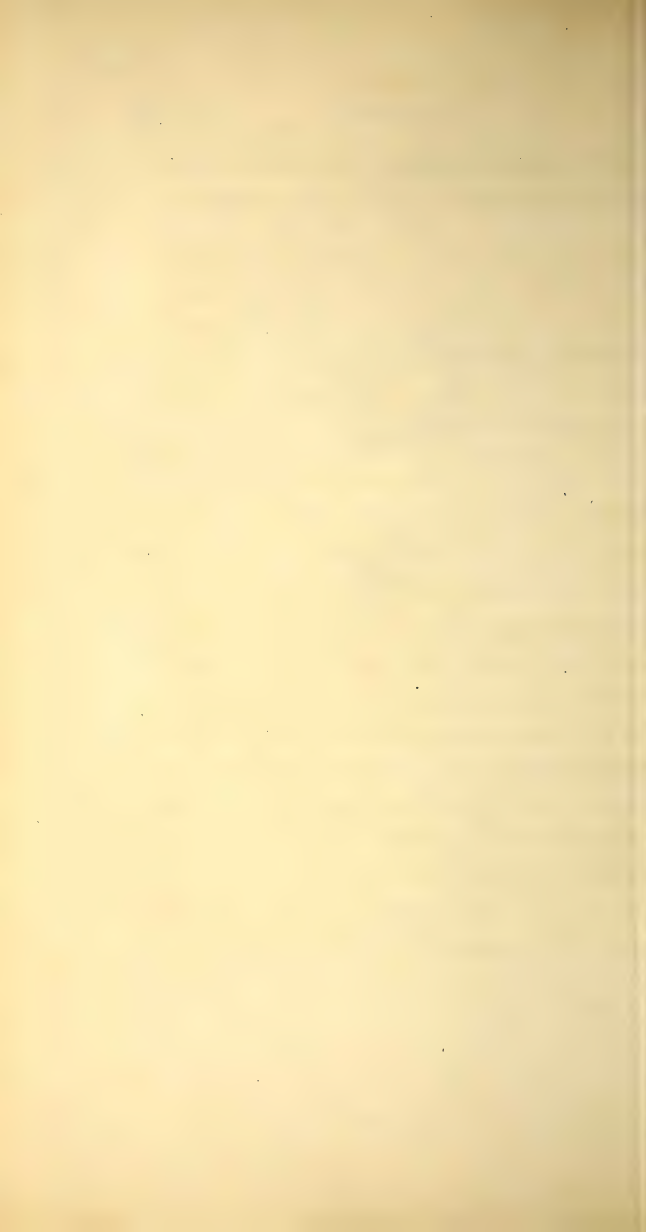
Inhabits Europe, and is found in vast abundance  
near stagnant waters.

Pl. 67. a. a. The plumose antennæ of the male mag-  
nified. b. The filiform rostrum, or piercer. c. The  
hairy palpi.

CULEX.



*C. pipiens.*





GENUS LXVIII. *EMPIS*.

## GENERIC CHARACTER.

*Antennæ* short, the last articulation ending in a lengthened point. *Mouth* with a strong, horny, bivalve proboscis, longer than the thorax, and bent inwards; the valves horizontal. *Palpi* two, very small, and triarticulate.

*General Observations.*

The species of this genus are for the most part very small; some indeed appear to exceed the size of a common fly, but it is more in the extent of their wings than in the volume of their bodies. They are all carnivorous; the larger species attacking flies, and the smaller ones a prey in proportion to their size. The male and female are often seen united for the purpose of propagating their species, and at the same time satisfying their voracity, by sucking through their long trunk the juices of a fly. The abdomen of the *Empis* is long, and pointed at the end. In the female it is terminated by two

little moveable stems: in the male, by a double scaly piece with two hooks, with which the insect grapples with the female when he wishes to confine her.

The larvæ are not known. The perfect insects frequent gardens, and are found about flowers.

#### SPECIFICATION.

EMPIS PENNIPES. E. antennis filatis nigra, pedibus posticis longis alterius sexus pennatis. *Linn. Syst. Nat.* 1. p. 1003. *Gmel.* p. 2889. *Fabr. Spec. Ins.* 2. p. 471. *Mant. Ins.* 2. p. 364. *Ent. Syst.* 4. p. 404.

*Sulz. Ins. t.* 21. *f.* 137.

*Panzer, Faun. Ins. Germ. fasc.* 74. *t.* 18.

Inhabits Europe, and frequents the flowers of the *Geranium sylvaticum* and *Cardamine pratensis*, &c. It varies greatly in size, from the figure in the plate to three-eighths of an inch long. The feathered legs are peculiar to one sex, the other has them not.

Pl. 68. a. The natural size. b. The same magnified. c. The head and pointed antennæ. d. The proboscis and the two palpi.

EMPI S.



*E. pennipes.*



GENUS LXIX. *CONOPS*.

## GENERIC CHARACTER.

*Antennæ* very short, triarticulate, the last articulation clavated and terminated by a lateral hair. *Mouth* with an extended proboscis formed of three joints.

*General Observations.*

We find these insects in the fields, the gardens, the meadows, and every where, on flowers which yield the honeyed juice on which some of the species feed, while others suck the blood of animals. Among these last the Linnæan *C. calcitrans* (the *Stomoxys* of Geoffroy, &c.) is often mistaken for the common window-fly, but may be readily distinguished by its strong and pointed proboscis. Without such an examination, our legs are frequently made sensible of the difference in the autumnal season, by the sharp bite of the insect while in the act of sucking our blood. These, like the *Tabani*, are most troublesome on the approach of rain,

and are great tormentors of horses and cattle. Their metamorphosis is unknown.

## SPECIFICATION.

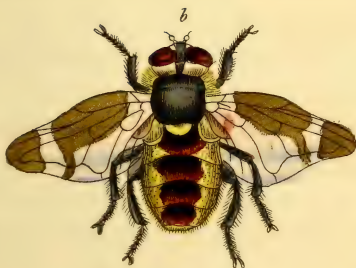
CONOPS SUBCOLEOPTRATA. C. antennis setariis, abdomine subferrugineo, alis præmorsis externe crassioribus. *Linn. Syst. Nat.* 1. p. 1006.

*Panzer, Faun. Ins. Germ. fasc. 74. t. 13.* Thereva.

Inhabits Europe, and is found in Germany, &c.

Pl. 69. a. Natural size. b. The same magnified.  
c. The antennæ.

CONOPS.



*C. subcoleoprata.*





GENUS LXX. *ASILUS*.

## GENERIC CHARACTER.

*Antennæ* with four articulations, the last a bristle arising from a cone. *Mouth* with a straight, extended, horny, bivalve rostrum. *Palpi* two, short, downy and filiform.

*General Observations.*

In the insects of this genus, the halteres, or balancers, (two little globular bodies placed on slender stalks beneath the wings,) are very apparent. The body is more or less hairy; in some species it is very downy, and the head in general is furnished with hairs like those on the body. The Asili live by rapine, preying on other insects, and attacking not only flies, tipulæ, &c. but even bees, and some of the Coleoptera. They seize their prey with their long legs, kill it with their horny trunk, and suck all the juices from its body. The majority of the species frequent woods and dry places, flying about with rapidity in hot and clear weather: some

inhabit low, moist meadows, and are troublesome to cattle.

The larvæ, which are white, soft, cylindrical worms, pointed at both ends, and without feet, live under ground. The head, sometimes hairy, is armed with two moveable fangs of a dark colour, which the animal uses to work its way into the ground. The chrysalis is long, and the abdomen takes a conical figure. The head is large, and has several scaly points like spines.

The *Asilus* has such a propensity to sting, that it has not unaptly been called the Wasp-fly, though the sting is inflicted by the head, not the tail.

#### SPECIFICATION.

*ASILUS EPHIPPIMUM*. *A. hirsutus ater*, thorace basi albo. *Linn. Syst. Nat. Gmel.* 1. p. 2896. *Fabr. Spec. Ins.* 2. p. 461. *Mant. Ins.* 2. p. 358. *Ent. Syst.* 4. p. 377.

*Degeer, Ins.* 6. t. 13. f. 9.

*Panzer, Faun. Ins. Germ. fasc.* 39. t. 23.

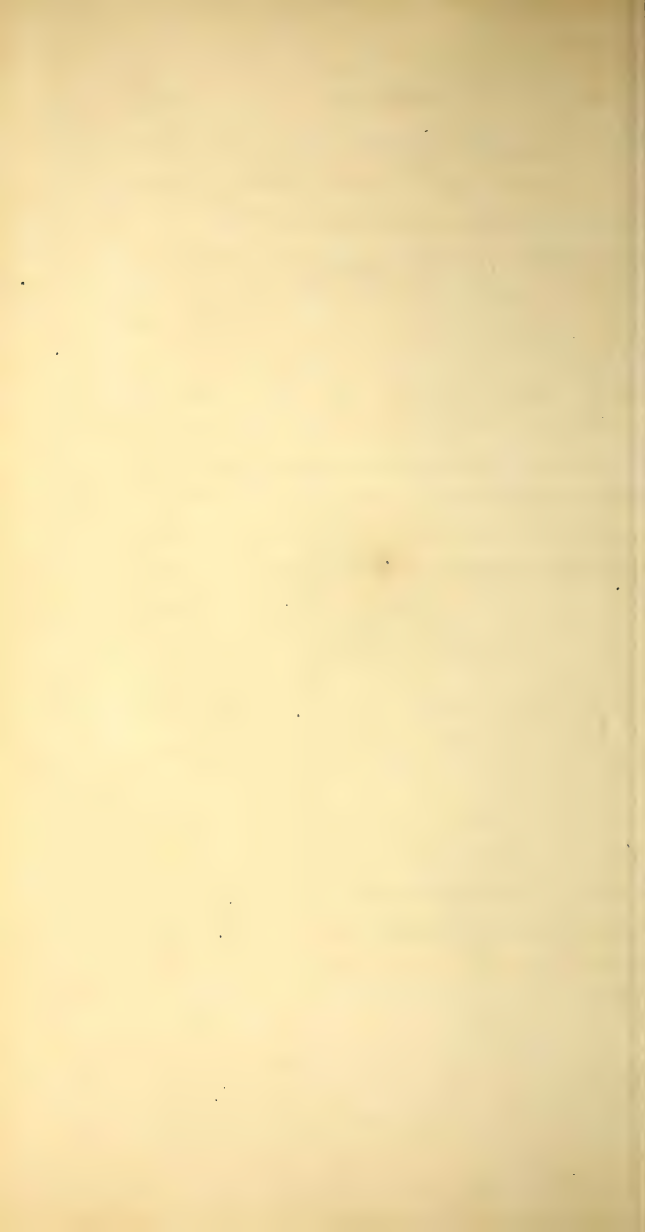
Inhabits Germany, and is found in woods.

Pl. 73. a. One of the antennæ magnified.

ASILUS.



*A. ephippium.*



GENUS LXXI. *BOMBYLIUS*.

## GENERIC CHARACTER.

*Antennæ* united at the base, with three articulations, the last pointed. *Mouth* with a long extended, setaceous, bivalve trunk, with horizontal valves, containing the stings or bristles. *Palpi* two, very short.

*General Observations.*

The long and close hairs with which the body of the *Bombylius* is covered, make it appear larger than it really is. Several species of the genus are very common in the spring, and are to be found in gardens, in woods, and in low marshy grounds. They are lively and very quick in their motions, and may be known at a distance, by the habit they have of hanging, as if suspended, over a flower till they are approached, and then instantly darting off to a distance. With their long, straight trunk, which is a strong characteristic mark, they rob the plants of their honeyed juice, passing successively, and with the greatest rapidity, from

flower to flower without resting, and making at the same time a noise with their wings like the Humble-bee. The different species have but one mode of life. They all derive their nourishment from the nectaries of flowers, none of them attacking animals, or sucking blood, like the Conopsides, or the Asili.

The larvæ are unknown; but from the Bombylii being frequently seen about watery places, it may be conjectured that they are aquatic.

#### SPECIFICATION.

BOMBYLIUS MAJOR. B. alis dimidiato nigris. *Linn.*

*Syst. Nat.* 1. p. 1009. *Gmel.* p. 2902. *Fabr. Spec.*

*Ins.* 2. p. 472. *Mant. Ins.* 2. p. 365. *Ent. Syst.* 4. p. 407.

*Degeer, Ins.* 6. t. 15. f. 10.

*Reaumur. Ins.* 4. t. 8. f. 11—13.

*Schaeff. Elem.* t. 27.

*Icon.* t. 79. f. 5.

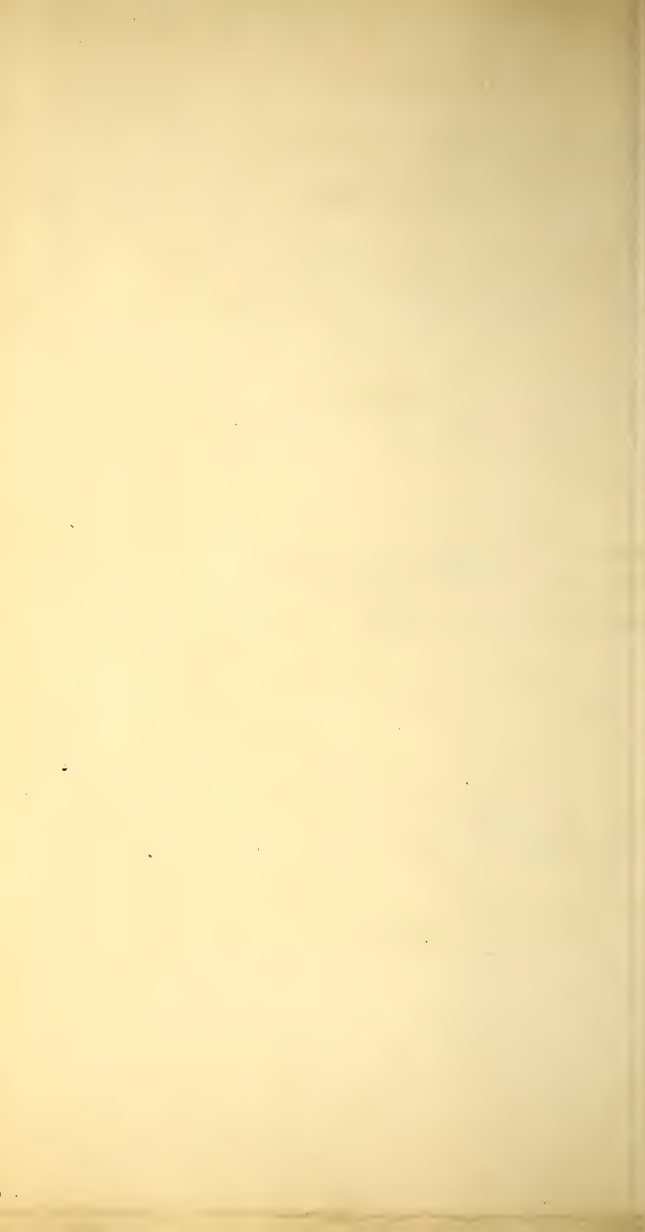
Inhabits Europe, and is found in gardens, &c.

Pl. 71. a. The head enlarged. b. The trunk. c. The antennæ.

BOMBYLIUS.



*B. major.*





GENUS LXXII. *HIPPOBOSCA.*

## GENERIC CHARACTER.

*Antennæ* filiform. *Mouth*, with a bivalve, cylindric, obtuse rostrum, shaking as if loose. *Body* depressed. *Feet* armed with many nails, or claws.

*General Observations.*

The Hippoboscæ, which are generally known by the name of Horse-flies, are found in woods and marshy places, sticking, whenever they have an opportunity, to the bodies of horses and other animals, and sucking their blood, upon which alone they subsist.

They attack those parts of the body least defended by hair, particularly the belly and the buttocks of the horse; but they produce the greatest degree of inquietude when they get under the tail. If driven off, they will, after a short flight, return with obstinate perseverance, and again stick to the body of the animal. Sheep are infested by a particular species, well known by the name of the Sheep-Tick, and remark-

able for being an apterous insect, wanting the wings with which the others are provided. Birds are also subject to the visitations of this genus, and they are to be found between the feathers of the swallow, the sparrow, and others of the smaller kinds.

There is a singularity attending the generation of the Hippoboscæ, which is highly deserving of notice. Other winged insects pass from the egg to the caterpillar, or maggot, then to the chrysalis, and lastly to the perfect fly. But the Hippobosca has a shorter way of completing its purpose. The female lays an egg of a size which excites astonishment, since it equals, if it does not exceed, that of the abdomen from whence it proceeds. This egg may be considered as a chrysalis, undergoing no further alteration, except changing in colour, from a brown to a deep shining black, till the fly ready formed for action issues from the shell.

The different species of this genus are very tenacious of life, and most of them have so firm and coriaceous a skin, that a moderate degree of pressure has no effect upon them.



HIPPOBOSCA.



*H. Hirundinis.*

## SPECIFICATION.

HIPPOBOSCA HIRUNDINIS. H. alis subulatis, pedibus sexdactylis. *Linn. Syst. Nat.* 1. p. 1010. *Gmel.* p. 2905. *Fabr. Spec. Ins.* 2. p. 475. *Mant. Ins.* 2. p. 367. *Ent. Syst.* 4. p. 415.

*Reaum. Ins.* 4. t. 11. f. 1—5.

*Schaeff. Elem.* t. 70.

—— *Icon.* t. 55. f. 1, 2.

*Panzer, Faun. Ins. Germ. fasc.* 7.

Inhabits the nest of the swallow, and is found on its body, as well as on that of the swift and martin.

Pl. 72. a. The natural size. b. The same magnified.  
c. The hind leg.



## ORDER VII.

*APTERA.*

**L**INNÆUS established the six preceding Orders on the number, the form, and the consistence of the wings ; parts of the body the most constant, and the best adapted for a methodical division of insects. For the seventh and last, he has reserved all those which have no wings in either sex at any period of their lives.





GENUS LXXIII. *LEPISMA*.

## GENERIC CHARACTER.

*Antennæ* setaceous, longer than the body.

*Mouth* with two projecting membranous jaws. *Palpi* four; two setaceous, and two capitated. *Body* covered with scales. *Tail* terminated by three straight bristles. *Feet* six, formed for running.

*General Observations.*

One of the species of this genus, the *Lepisma Saccharina*, is familiar to most people and too remarkable to be mistaken. It is an inhabitant of our houses, and may occasionally be seen running upon our casements, and hiding itself in the holes, or under the sashes of our windows. The silvery covering of its back, comes off as easily upon the fingers as the scales from the butterfly's wing; and its bright colour, its lengthened body, and the agility with which it seems to glide along, give it somewhat the resemblance of a little fish. It is supposed to have been imported originally from America

among some sugar, from whence originated the Linnæan specific name; but the insect feeds also on other substances, and is destructive to books and woollen clothes. It suffers no metamorphosis, but merely changes its skin.

Of the seven species described in Gmelin's edition of the *Systema Naturæ* one only is extra European, the *L. villosa*, an inhabitant of China.

## SPECIFICATION.

LEPISMA SACCHARINA. *L. squamosa cauda triplici.* *Linn. Syst. Nat.* 1. p. 1012. *Gmel.* p. 2706.  
*Fabr. Spec. Ins.* 1. p. 379. *Mant. Ins.* 1. p. 242.  
*Ent. Syst.* 2. p. 63.

*Degeer, Ins.* 7. p. 14. No. 1.

*Sulz. Ins. t.* 22. f. 147.

*Schaeff. Elem. t.* 75.

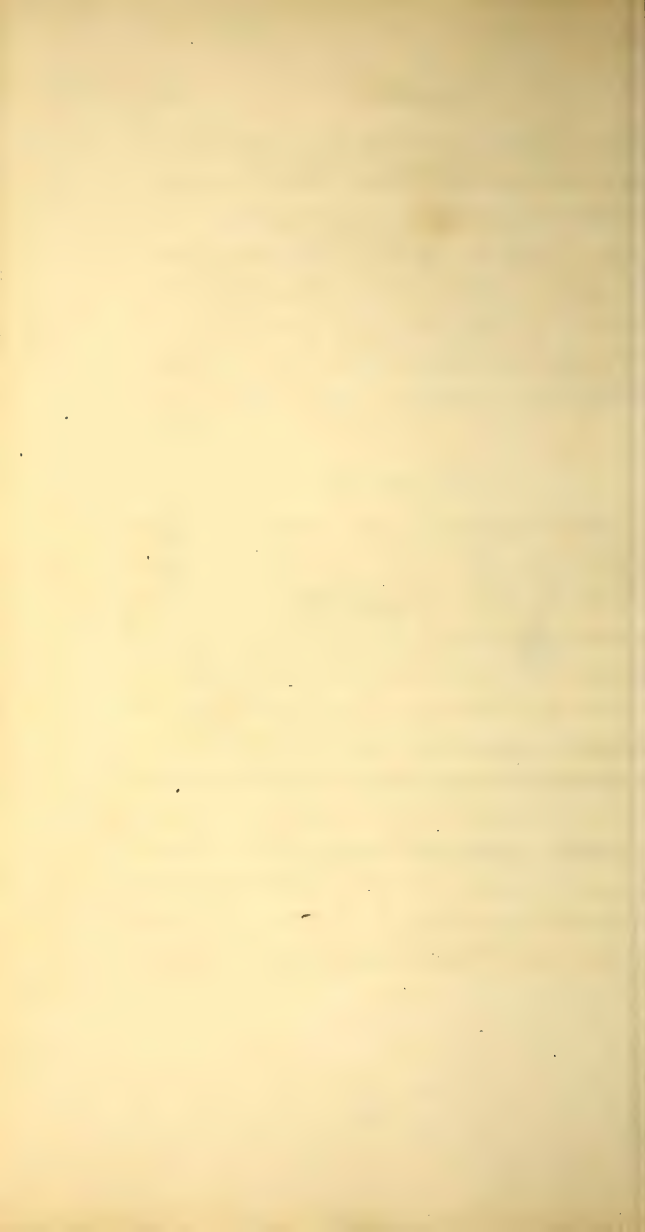
Inhabits America, and is now common in Europe. Is generally found in houses upon the window-frames, &c.

Pl. 73. a. The antennæ, &c. enlarged. b. The tail with its bristles,

LEPISMA.



*L. saccharina.*



GENUS LXXIV. *PODURA*.

## GENERIC CHARACTER.

*Antennæ* long and setaceous. *Mouth* with a bifid lip. *Palpi* four, subclavated. *Eyes* two, composed of eight pieces. *Legs* six, formed for running. *Tail* forked, bent inwards under the body, elastic, and acts as a spring by which the insect leaps.

*General Observations.*

The most remarkable character in the *Podura*, and that which is peculiar to the genus, is the long moveable tail, which is perfectly elastic, and consists of two pieces pointed at their extremity, re-united at the base, recurved under the abdomen, and received into a groove when the insect is at rest. When disturbed, which is always when about to be touched, the *Podura* straightens its tail, and strikes it strongly against the ground. The blow produces the effect of a spring, and the insect by the effort is carried to the distance of two or three inches. As soon as its purpose is effected,

the tail returns to its first position. The Poduræ are found on plants and trees; some live on the surface of stagnant water, where they walk and leap as if on firm ground; others are met with on the sandy roads; and wherever they are found, it is generally in great abundance; sometimes in such a quantity as to blacken the spot.

They are oviparous, but undergo no metamorphosis. They leave the egg perfectly formed, increasing daily, and sometimes changing their skin. It appears that they live part of the winter, during which time they lay their eggs. Degeer observed these insects in Holland, alive and very alert during the greatest cold. Their eggs, which were near them, were of a yellow colour, and contained nothing in the shape of an insect, but only a few black points. Some days afterwards the little Poduræ appeared, with their forked tail ready for leaping.

#### SPECIFICATION.

PODURA PLUMBEA. *P. teres fusco-cærulea nitida.*

*Linn. Syst. Nat. 1. p. 1013. Gmel. p. 2903. Fabr.*

PODURA.



*P. plumbea.*





*Spec. Ins.* 1. p. 381. *Mant. Ins.* 1. p. 243. *Ent.*  
*Syst.* 2. p. 66.

*Degeer, Ins.* 7. t. 3. f. 1.

*Sulz. Ins. t.* 22. f. 143.

Inhabits Europe, and is found on plants.

Pl. 74. a. The natural size. b. The same magnified.

GENUS LXXV. *TERMES*.

## GENERIC CHARACTER.

*Antennæ* setaceous. *Mouth* armed with two horny jaws. *Palpi* four. *Eyes* two. *Legs* six, formed for running.

*General Observations.*

Some of the species of this genus have much in their habits and economy to admire, but more to dread. The *Termes fatale*, or White Ants, are justly termed by Linnæus the scourge of the East. They form curious conical nests, 10 or 12 feet in height, divided into regular apartments, with galleries of communication and magazines for provisions. These nests are so strong, that they will bear four men to stand upon them, and in some parts of Africa so numerous, that at a distance they appear like a village belonging to the natives. They inhabit the East Indies, Africa, and South America, and destroy houses, furniture, &c. with such rapidity and industry, that a large beam will be reduced in a few hours to a mere

shell, not thicker than writing-paper. The Termites, when they get within a box, often make a nest there, and, being once in possession, destroy it at their leisure. "They did so," says Smeathman, "to the pyramidal box which contained my compound microscope. It was of mahogany, and I had left it in the store of Governor Campbell of Tobago, for a few months, while I made the tour of the Leeward islands. On my return I found these insects had done much mischief in the store, and, among other things, had taken possession of the microscope, and eaten every thing about it except the glass or metal, and the board on which the pedestal is fixed, with the drawers under it, and the things inclosed. The cells were built all round the pedestal and the tube, and attached to it on every side. Another party had taken a liking to the staves of a Madeira cask, and had let out almost a pipe of fine old wine."

The European species, the *Termes pulsatorium*, is a common insect in houses, in the summer season, when it is often heard, though seldom seen. The sound it makes resembles

the ticking of a watch, and is generally continued for a considerable time. That insects possess the faculty of hearing can hardly be doubted, since these Termites will readily answer if a pin be tapped upon the table or against the wainscot, so as to imitate their ticking. The sound is supposed to be produced by one sex, for the purpose of attracting the other.

## SPECIFICATION.

TERMES PULSATORIUM. T. abdomine oblongo, ore rubro, oculis luteis. *Linn. Syst. Nat.* 1. p. 1015.  
*Gmel.* 1. p. 2914.

*Fabr. Spec. Ins.* 1. p. 394. *Mant. Ins.* 1. p. 248. *Ent. Syst.* 2. p. 87. Hemerobius pulsatorius.

*Degeer, Ins.* 7. p. 41. t. 4. f. 1. T: lignorum.

*Sulz. Ins. t.* 22. f. 144.

*Schaeff. Elem. t.* 126.

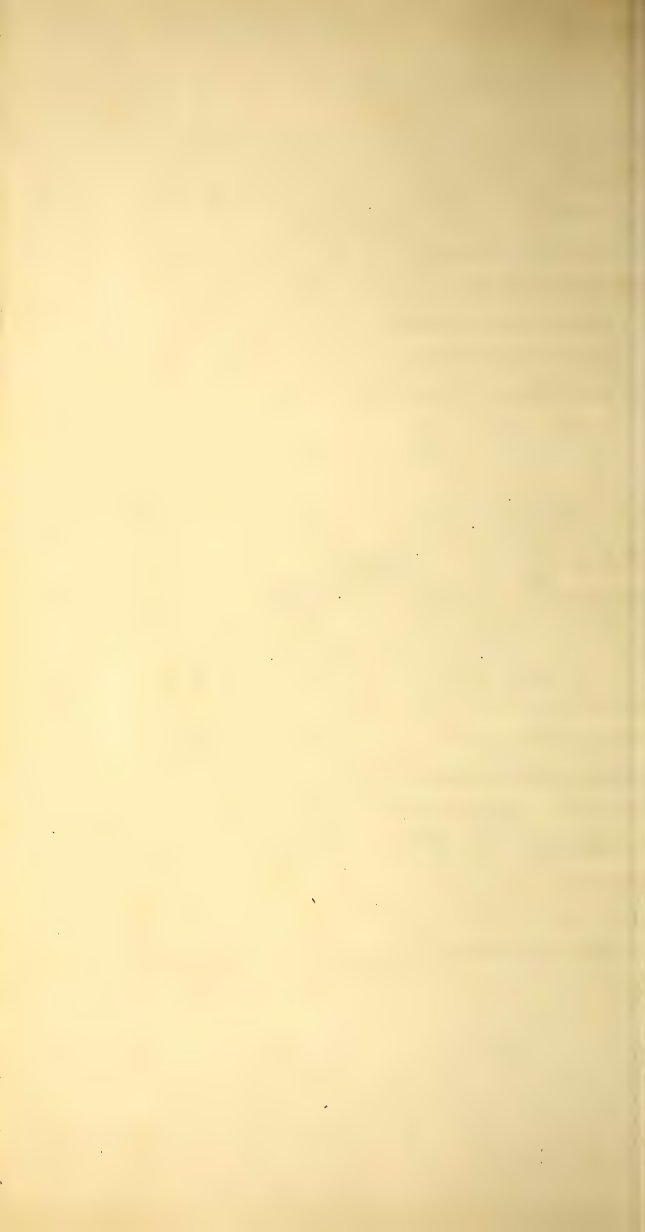
Inhabits Europe and America, and is common in houses, also in collections of dried plants.

Pl. 75. a. Natural size. b. The same magnified.

TERMES.



*T. pulsatorium.*



GENUS LXXVI. *PEDICULUS*.

## GENERIC CHARACTER.

*Antennæ* the length of the thorax. *Mouth* contains an exserted sting. *Eyes* two. *Abdomen* depressed and somewhat lobed. *Feet* six, formed for walking.

*General Observations.*

All lice live by suction ; some on the blood of man, others on that of quadrupeds and birds. The microscope shows the instrument by which this purpose is effected. It is a proboscis, generally concealed in its sheath, very sharp, and provided towards one end with some reversed prickles. Leuwenhoek affirms that the male has a sting in the tail, by which it inflicts the wound that causes the itching ; but this is improbable, since the purpose of the insect is to obtain food, and that must first pass through the trunk, not the tail. These insects are oviparous, and multiply amazingly. The young soon issue from the eggs (or nits as they are called), and after having changed the skin two

or three times, are ready to produce in their turn. Experience has shown that in six days a louse will produce 50 eggs. The young leave the shell about the same period of time, and in about 18 days more are in a state for reproduction. From these observations, and the calculations arising from them, it appears that two females may have 18,000 little ones in the space of two months.

Oviedo makes a singular remark, though unsupported by proof. He says that the lice quitted the heads of the Spanish sailors in a certain latitude, while on their voyage to India, and returned to them again, in the same latitude, in their way back.

Hottentots and monkeys seem to delight in the filthy custom of eating these insects, and there is reason to believe that the same nauseous inclination prevails among the lower class of the Russians.

Most of the quadrupeds and birds seem to have their peculiar species of this disgusting genus, and even fish and insects are not totally exempt from them.





PEDICULUS.



*P. Luis.*

SPECIFICATION.

PEDICULUS SUIS. P. Suis Scrofæ. *Linn. Syst. Nat.* 1.

*p.* 1017. *Gmel.* 1. *p.* 2925.

*Redi Exper. t.* 21. Pediculus Asini.

*Panzer, Faun. Ins. Germ. fasc.* 51. *t.* 16.

Inhabits the hog.

Pl. 76. a. The natural size. b. The same magnified.

GENUS LXXVII. *PULEX*.

## GENERIC CHARACTER.

*Antennæ* moniliform, growing thicker towards the points. *Mouth* with an elongated, inflected, setaceous snout concealing a sting. *Eyes* two. *Abdomen* compressed. *Legs* six, formed for leaping.

*General Observations.*

It is singular that the Flea is the only one of the apterous insects, that undergoes the same metamorphosis with those of the other orders, all the other apterous insects being produced in their perfect state, either by the mother or from the egg. The larva has a forked tail, and spins a covering for the chrysalis, which has feet, of which, however, it can make no use, they being immoveable. Yeats, from whose Institutions of Entomology the above information is derived, adds that they are small, lively, and creep like caterpillars; they pass fourteen or fifteen days in their larva state, before they undergo their second transformation.

The flea has more strength and agility in proportion to its size than any other animal. A flea, by a dexterous contrivance, has been fastened to a small cannon, which it has dragged along without difficulty; and it is not uncommon to find it exhibited at country fairs, either drawing a chain fixed to its scaly body, at least thirty times heavier than itself, or springing along with a little ivory chariot behind it.

It was thought unnecessary to design this little animal, which is every where figured and every where known. Another species was therefore preferred, which, though it belongs to the same genus, is totally unknown in this climate. The Chigger (*Pulex penetrans*), the pest of the West Indies and South America, is so small as to be hardly perceptible: the magnified representation has consequently been given alone, which, together with the following description, is taken from Catesby: "It is a very small flea, that is found only in warm climates: it is a very troublesome insect, especially to negroes, and others that go barefoot and are slovenly. They penetrate the skin, under which they lay

a bunch or bag of eggs, which swell to the bigness of a small pea or tare, and give great pain till taken out; to perform which great care is required for fear of breaking the bag, which endangers a mortification, and the loss of a leg, and sometimes of life itself. This insect in its natural size is not above a fourth part so big as the common flea. From the mouth issues a hollow tube like that of the common flea, between a pair of antennæ. It has six jointed legs, and something resembling a tail. The egg is so small as to be scarcely discerned by the naked eye. These Chigoes are a nuisance to most parts of America between the tropics."

The feet and legs are particularly liable to the attacks of this insect. It generally gets under the nails of the toes, where it lays its eggs, and multiplies to a fearful degree if not removed in time.

#### SPECIFICATION.

PULEX PENETRANS. P. proboscide corporis longitudine. *Linn. Syst. Nat.* 1. p. 1021. *Gmel.* p. 2924.

PULEX.



*P. penetrans.*





*Fabr. Spec. Ins.* 2. p. 383. *Mant. Ins.* 2. p. 314. *Ent. Syst.* 4. p. 209.

*Sloane's Jamaica*, 2. p. 191. *Introd.* 125.

*Browne's Jam.* 418.

*Catesby's Carolina*, 3. p. 10. t. 10. f. 3.

Inhabits the West Indies and South America, and is called Chigger or Jigger.

Pl. 77.

GENUS LXXVIII. *ACARUS*.

## GENERIC CHARACTER.

*Mouth* with a rostrum inclosed in a sheath.

*Eyes* two, situated on each side of the head.

Two articulated tentacula in the form of feet.

*Legs* eight.

*General Observations.*

This is a numerous genus, and contains a well-known inhabitant of our mouldy cheese. Without the assistance of the microscope nothing could have been known of this diminutive being; but with such powerful aid we are enabled to discover a moveable lump of transparent fat, with eight legs, and a body scattered with long hairs. Such is the common mite, which is seen moving from one particle of cheese to another, with an awkward action of the legs, and dragging after it, seemingly with difficulty, its gross and unwieldy body. Leuwenhoek, that indefatigable observer of the microscopic world, tells us that mites are oviparous, laying very small, white, oval eggs; that the young

animals resemble the parents in all respects except in the number of legs, which at first are only six, and that it is not uncommon to see them struggling to get clear of the egg-shell for a whole day, before they can accomplish their purpose.

The animal which occasions the disease called the itch is an *Acarus*, as is also the harvest bug, which attends so closely to the legs of the traveller, as he passes through the corn-fields in Autumn. *Karapate* is a name given by the inhabitants of the Isle of Bourbon to a species of *Acarus*, which infests the fowls to such a degree, that they are sometimes unable to bring their wings close to their bodies, on account of the quantity of acari lodged under them. The only remedy is to burn the hen-roost, and that is often ineffectual, since the new building frequently becomes filled with these insects in the course of six months.

Of this genus there are some kinds that attach themselves peculiarly to other insects; of these the most common is the *Acarus Coleoptratorum*, figured in Pl. 78. This species has so strong

an attachment to the *Scarabæus stercorarius*, that its back is often covered with them, and the motion of its legs impeded by their numbers.

## SPECIFICATION.

ACARUS COLEOPTRATORUM. A. rufus, ano albicante.

*Linn. Syst. Nat.* 1. p. 1026. *Gmel.* p. 2930. *Fabr.*

*Spec. Ins.* 2. p. 491. *Mant. Ins.* 2. p. 373. *Ent.*

*Syst.* 4. p. 432.

*Degeer, Ins.* 7. t. 6. f. 15.

*Roesel. Ins.* 4. t. 1. f. 10—15.

*Schaeff. Icon.* t. 27. f. 2.

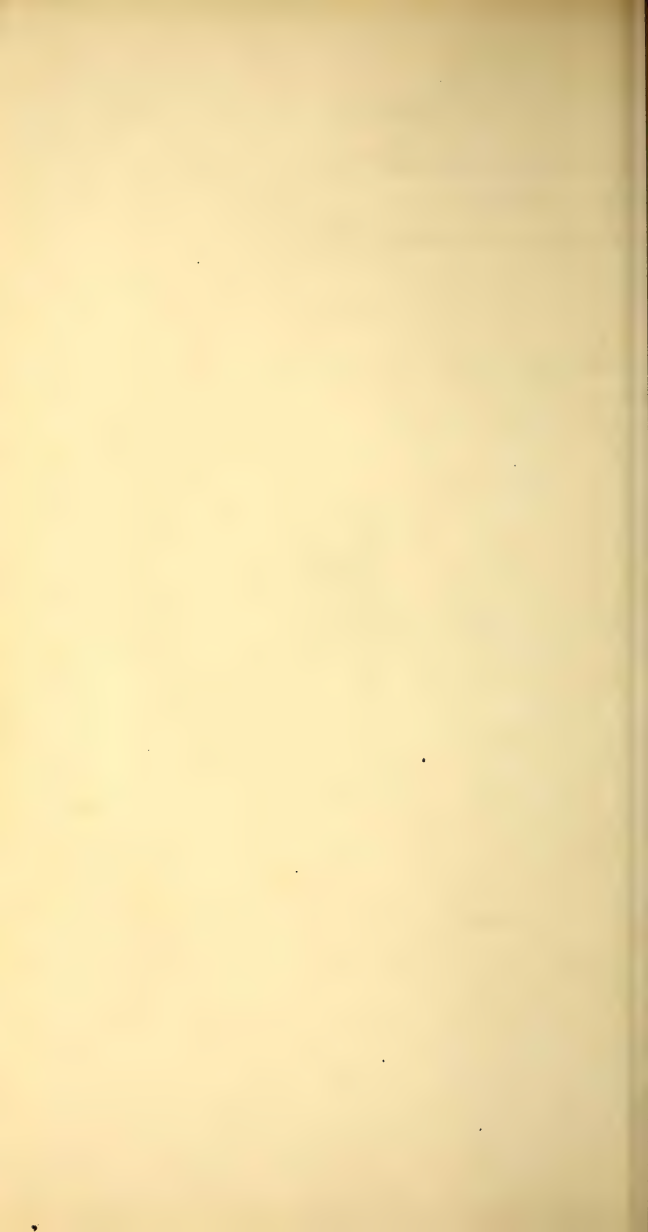
Inhabits Scarabæi.

Pl. 78. a. Natural size. b. The same magnified.  
c. The articulated tentacula, with the rostrum between.

## ACARUS.



*A. coleoptratorum.*



GENUS LXXIX. *PHALANGIUM*.

## GENERIC CHARACTER.

*Front* furnished with two cheliform mandibles, like crab's claws. *Eyes* four ; two vertical, and two lateral. *Abdomen* rounded. *Legs* eight. *Tarsi* composed of many pieces.

*General Observations.*

The limbs of the *Phalangium* retain their vitality in a remarkable degree. They are very easily detached from the body, and the insect, in its endeavour to escape, will often leave one or two of its legs between our fingers. Children, with their usual propensity for mischief, and aware of what is to happen, separate a limb or two from the long-legged harvest spider ; and laying it down, amuse themselves with observing the convulsive motion of the joints, which continue to act, alternately contracting and expanding the limb for some hours, before the motion entirely ceases. Geoffroy is of opinion, that the *Phalangium* has the power of reproduction ; and, like the crab and the lob-

ster, will produce a new limb in the room of that which has been torn off. He was led to this persuasion from observing a Phalangium with seven full-sized legs, and an eighth at least two-thirds smaller than the others.

The Phalangia bear a strong general resemblance to the insects of the following genus, from which however they may be readily distinguished by their striking mandibles extending from the head, and terminating in a moveable fang; and by the abdomen making one with the thorax, instead of being separated, as in the spiders properly so called. The tarsi also are composed of many pieces in this genus, but of two only in the next.

The Phalangia undergo no transformation; they always retain the same form, with this difference only, that the legs of the young ones are proportionally shorter than those which are full grown. The different species vary greatly in size; some equalling the larger kinds of spiders, whilst others are very minute. All, it is believed, are of a carnivorous nature, and prey upon insects smaller than themselves. Their





PHALANGIUM.



*P. Hellwigii.*

provision for a future progeny is conducted in the usual manner. Degeer saw a female Phalangium laying her eggs the size of a grain of sand, perfectly spherical, very white, covered with a membranous and flexible skin, and deposited in little heaps by the side of each other.

## SPECIFICATION.

PHALANGIUM HELLWIGII. P. atrum, abdomine lævi elliptico, chelis aculeatis.

*Panzer, Faun. Ins. Germ. fasc. 13. t. 18.*

Inhabits Germany.

Pl. 79. a. One of the cheliform fangs magnified.

GENUS LXXX. *ARANEA*.

## GENERIC CHARACTER.

*Eyes* eight, convex. *Mouth* provided with two jaws, each terminated by a simple, arched, pointed, and moveable hook. *Palpi* two, articulated; the clubbed tips in the male distinguish the sex. *Abdomen* joined to the thorax by a short stalk, and terminated by papillæ, like nipples, through which the thread is drawn. *Legs* eight. *Tarsi* composed of two pieces.

*General Observations.*

This is a numerous and well-known genus, the terror of many and the antipathy of all. It is a proscribed race, which we think ourselves entitled to destroy whenever we have an opportunity, from feelings of disgust, rather than from the operation of reason. This feeling seems implanted as it were in our nature, from which even the Naturalist is not wholly exempt; and it tends, together with other causes, to

check the multiplication of an insect, which would otherwise become by far too numerous.

The eight eyes with which the spider is provided are fixed points, disposed in a different order in different species, insomuch that authors have taken advantage of the circumstance, to divide the genus into families. They are hard, smooth, and brilliant, and are always placed on the head, *i. e.* before the two oblique lines which are seen between the head and the thorax. The inconvenience which might arise from their want of motion, is remedied by their number and position, which is well calculated to comprehend every view compatible with the wants or safety of the animal. There is little doubt that the spider can inject a venomous liquor into the wound made with its fangs. Instances, and those related by authors of credit, have occurred, of inflammation succeeding the bite of a spider on the human body.

The female spider lays a number of eggs, of which she takes the greatest care, as well as of the young when they are hatched, exposing herself to every danger when it becomes ne-

cessary to defend them. At other times spiders are very fearful, and fly with precipitation whenever they are approached; but if by any chance while the female is carrying her little ones on her back one of them should fall off, she would rather perish than abandon it, and will wait with firmness till all danger be passed; after which the young one will remount, and the mother continue her journey. She is devoted to her eggs, which she never abandons. If they are taken from her, she exhibits the greatest degree of inquietude, moving about with rapidity from place to place in search of them: if they are restored, she seizes them with precipitation, and runs off as fast as possible. This fondness of the spiders for their young is the more remarkable, as they are a solitary race, appearing to avoid and hate their fellows, and even devouring each other when they have an opportunity.

Birds are for the most part very fond of spiders, and destroy vast numbers of them. They are also the prey of other insects, particularly of the *Sphex* and the *Ichneumon*. This may be illustrated by an extract from some manu-

cript notes and observations on the spiders of Georgia, in America, by Mr. Abbot. "Many very rare and curious spiders," says this gentleman, "may be found in the nests of their great enemies, the Dirt-daubers, or Mason-flies (probably the *Sphex spirifex*). These flies make oblong cases of clay, which they plaster in layers, to roofs, ceilings, and other convenient places. When finished, they lay an egg inside at the end, then fill it with spiders, and plaster them up. It is remarkable that they have the art to enchant, or rather to embalm alive the spiders. Upon opening one of these nests, cells, or cases, the spiders are found alive, but unable to walk or make the least resistance, being just able to move a little, sometimes a leg; they appear plump and fresh in colour, and not in the least emaciated. I imagine they do this by stinging them, a wonderful provision of nature, to provide the worms with fresh and proper food as long as they need it. Upon inclosing some of these spiders in a box, they continued plump and fresh for several days before they began to alter or wither. A single fly will build several



cells alongside and upon each other. They destroy an amazing number of spiders, generally putting all or the most part of one particular species together in one cell. Several of these are very rare, such as I imagine must live chiefly on the top branches of the loftiest trees, as I could never otherways meet with them. Opening several of these cases, at once affords a most curious and pleasing sight, to see such a large quantity of spiders at one view, of the rarest kinds and of the most beautiful colours. Could it be possible to continue their preservation in all their beauty and freshness, they would make a very interesting addition to this branch of Natural History."

## SPECIFICATION.

ARANEA DIADEMA. A. abdomine subgloboso rubro-fusco; cruce albo punctata. *Linn. Syst. Nat.* 1. p. 1030. *Gmel.* p. 2946. *Fabr. Spec. Ins.* 1. p. 540. *Mant. Ins.* 1. p. 344. *Ent. Syst.* 2. p. 407. *Degeer, Ins.* 7. p. 218. *t.* 11. *f.* 3. *Clerck, Aran.* 25. *t.* 1. *f.* 4. 3. *Schaeff. Elem.* *t.* 21.



ARANEÆ.



*A. diadema.*



*Schaeff. Icon. t. 19. f. 9.*

*Panzer, Faun. Ins. Germ. fasc. 40. t. 21. A. regalis.*

Inhabits Europe, in gardens, woods, &c.

Pl. 80. a. The eyes magnified. b. The jaws the same.

GENUS LXXXI. *SCORPIO*.

## GENERIC CHARACTER.

*Eyes* eight; three on each side the thorax, and two on the back. *Legs* eight, besides two frontal chelæ or claws. *Tail* elongated, jointed, and terminated by a sharp crooked sting. Two pectens, or comb-like processes, are placed underneath between the thorax and the abdomen.

*General Observations.*

The insects of this genus delight in warm climates. They are to be found in the four quarters of the world, but the European species confines itself within a certain latitude. In the *Journal de Physique* for June 1817, Monsieur L. Dufour has given a detailed account of a reddish scorpion, which he has named *Scorpio occitanus*, a species inhabiting the same quarter of the globe, but specifically distinct from the *Scorpio Europæus*. Though alike in shape, in make, and in manners, these two species are never found together. It seems that they re-

ciprocally avoid the same localities. The former is very common in the kingdom of Valencia, and in Lower Catalonia, provinces in Spain, in which M. Dufour was unable to discover the slightest trace of the *S. Europæus*. We may in vain seek for the European scorpion in the dry hills and mountains in the environs of Narbonne, on those of a schistous and desert nature, which form a maritime ridge extending eight or ten leagues from north to south between Barcelona and St. Philip, or on the confines of Lower Catalonia with Arragon, countries where the reddish scorpion is found, and often in abundance. It is curious to remark the natural limits of these creatures. A little beyond Barcelona, we meet with the first plantations of a very common tree, the *Ceratonia siliqua*, and here likewise we find the first traces of the reddish scorpion. This agreement, as it were, holds good in all cases, with respect to soil and situation. Neither the *Ceratonia* nor the Scorpion can prosper except in dry lands exposed to great heat and situated at a short distance from the sea. M. Dufour pre-

sumes that this scorpion is confined in Spain within the limits above mentioned, and does not think it inhabits a greater height than 150 toises above the level of the sea, since the mountains of Porta-Coeli, situated six leagues to the west of Valentia, although within the zone of the reddish scorpion, but on an elevation favourable to the propagation of sub-alpine plants, did not show, notwithstanding the strictest search, any trace of this animal. The European scorpion is obliged to submit in the same manner to the influence of soil and temperature. In France, this creature begins to show itself about the latitude of 44 degrees, or under the zone where the almond and pomegranate are cultivated, and is lost in those northern limits which are favourable to the propagation of the olive.

The scorpion lives a solitary life: seldom but one, and never more than two are found under the same stone, or within the same hole. When they quit their retreat in search of food, which is commonly in the evening, or during the night, they carry their pincers advanced, and trail

their tail. But if irritated, or menaced by any danger, they fling their claws backward, and curving their pointed tail above the body, so that the sting may protect the head, they remain prepared either for defence or attack. They feed upon insects, but will sustain a long fast. M. Dufour kept one six months without food, and it did not appear to suffer in the least. The females carry their young upon their back, like the *Tarantula* spider.

These formidable insects do not confine themselves entirely to the stones and dark holes of unfrequented places; in hot climates they enter the houses, and even the beds of the inhabitants. They vary greatly in size; those of Europe scarcely exceeding an inch in length without the tail, while those of Africa and India are sometimes five inches long, and large in proportion. The venom of one of these last has been known to kill a dog, and greatly to injure a man. Scorpions are viviparous, and produce several young at a time.

## SPECIFICATION.

SCORPIO EUROPÆUS. *S. pectinibus 18-dentatis, manibus angulatis.* *Linn. Syst. Nat.* 1. p. 1038. *Gmel.* p. 2962. *Fabr. Spec. Ins.* 1. p. 551. *Mant. Ins.* 1. p. 348. *Ent. Syst.* 2. p. 434.

*Degeer, Ins.* 7. p. 344. t. 41. f. 5.

*Roes. Ins.* 3. t. 66. f. 1, 2.

*Schaeff. Elem.* t. 113.

Inhabits the warmer parts of Europe, and is found under stones and in holes. The specific character, taken from the number of teeth in the pecten, is not correct; they vary in different individuals of the same species.

Pl. 81. a. The pecten or comb magnified.



SCORPIO.



*S. europæus.*



GENUS LXXXII. *CANCER*.

## GENERIC CHARACTER.

*Eyes* two, moveable, generally pedunculated, or placed on footstalks projecting from the head. *Legs* eight, sometimes six or ten, besides two with claws. *Palpi* six, unequal. *Tail* jointed and unarmed.

*General Observations.*

Linnæus has divided the Crabs into the following families :

1. Brachyuri, or short-tailed crabs.
  - $\alpha$ . Thorax smooth, with the sides entire.
  - $\beta$ . ——— smooth, with the sides indented.
  - $\gamma$ . ——— hairy, or spinous on the upper part.
  - $\delta$ . ——— with spines only.
  - $\epsilon$ . ——— with an uneven surface.
2. Macrouri, or long-tailed crabs.
  - $\alpha$ . Thorax smooth.
  - $\beta$ . ——— uneven, or tuberculated.
  - $\gamma$ . ——— spinous.

- δ. Thorax oblong, and the hand without fingers.
- ε. ——— longer than the shell, which it does not cover completely.

This genus, which includes the Lobsters, Shrimps, and Prawns, has lately been expelled from the class of Insects, and very properly arranged in a separate department, by the name of Crustacea.

Crabs, having neither fins nor tail adapted for swimming, are obliged to confine themselves to the bottom of the sea, or to the sand upon its shore. They run sideways with great agility, but if a wave leaves them dry upon the shore, they immediately draw in their legs and remain immoveable. Once a year they cast their shells. This happens in the spring, and after the operation they remain for some time concealed in the sand till their new coat is sufficiently strong to guard them from the common accidents of their situation. There is one species in particular, to which Nature has not only denied any covering, but has left it conscious of

its nakedness. The *Cancer Bernhardus*, feeling its defenceless situation, and being in want of a shell of its own, is obliged to put up with any dead univalve it can meet with to its purpose. From this circumstance it has obtained the name of Hermit-crab, retiring within its cell when at rest, but protruding the fore part of its body when in motion, and in search of its prey.

The species of this numerous genus are not entirely confined to the ocean; some few are found in lakes, and in rivers; and there are also terrestrial crabs, which live on the ground and in the sand, where they dig holes which serve them for a retreat. The *Cancer Ruricola*, or land-crab, is a remarkable instance of the strong effect of instinct, which obliges them once a year to leave their inland habitations, and seek the sea-shore, for the purpose of casting their spawn. These crabs inhabit the tropical climates in great abundance, and have their retreats in the mountains. At the appointed time they descend in immense bodies, and move towards the sea, making a clattering with their claws, which

may be heard at a great distance. Nothing stops their progress, no obstruction makes them turn aside, they never deviate either to the right or left, but pass over every obstacle that it is possible for them to surmount without breaking their line. When arrived at the shore, it seems necessary that the sea-water should pass two or three times over their bodies; after this ablution they retire to land till the spawn has increased to a sufficient size, when they return again, and having cast it into the sea, retire directly to the mountains. The little crabs, the produce of the spawn, soon leave the shore, and repair by slow degrees to the habitations of their parents.

## SPECIFICATION.

CANCER HIRTELLUS. *C. Brachyurus*, thorace hirto, utrinque quinquedentato, manibus extus muricatis. *Linn. Syst. Nat.* 1. p. 1045. *Gmel.* p. 2977.

*Penn. Brit. Zool.* 1812. vol. 4. p. 9. pl. 6. f. 1.

*Herbst. Canc.* 5. p. 152. t. 7. f. 51.

Inhabits the Arctic Ocean. Is covered with stiff hairs, and has one claw much larger than the other.

Pl. 82.

CANCER.



*C. birtellus.*





GENUS LXXXIII. *MONOCULUS*.

## GENERIC CHARACTER.

*Antennæ* (in such species as have them) two, simple, or branched; those of the male thicker and shorter. *Eyes*, in most species, approximated, and fixed in the shell. *Body* covered with a crustaceous tegument. *Feet* formed for swimming.

*General Observations.*

All the Monoculi with which we are acquainted are aquatic. They live in lakes and marshes, and are often met with also in rivers. Their manner of moving is very singular. They use their branched antennæ in the room of arms; and with their aid they advance in the water, as it were, by starts or leaps. Their feet are also employed for the same purpose, but are not so effective as the horns. Monoculi are oviparous, and being transparent, the ovaria in the female may be very plainly seen within their crustaceous covering. Some carry their eggs in a more exposed situation, near the

origin of the tail, where they are collected in two oval packets, one on each side, in the shape of a bunch of grapes. This is particularly observable in the *M. quadricornis*, a diminutive insect not much larger than a mite, which has sometimes been brought to table in our spring-water. The female, with her long forked tail and bunches of little grapes, may be seen springing about in the water with great agility. These bunches of eggs they never part with till the young are hatched. The species which is by far the most common, and the most familiar to the unscientific observer, is the *M. Pulex*, or Water-flea. This is found in ponds, ditches, &c. at all seasons of the year, and in warm weather in such abundance, as often to discolour the water it inhabits. Its appearance is very singular when examined by the microscope; its body being inclosed in a bivalve sheath, from the opening of which proceeds its forked leg. The horns are branched in a peculiar manner, and the insect can move them in all directions, so as to contribute materially by their action, to that jerking motion in the

water, from whence this species of *Monoculus* has derived its trivial name. In the body of the female the bunch of eggs is very plainly seen through the transparent shelly covering. The eyes are formed of little black globules, situated very near to each other, and invested with a common membrane, which gives them the appearance of unity.

The insects of this genus are for the most part very minute, insomuch that their delicate structure can by no means be observed by the naked eye; but there are two, the *M. Apus*, and *M. Polyphemus*, which are quite exempt from this inconvenience. The former, an inhabitant of Europe, is nearly an inch and three quarters long; and the latter, a native of India, and better known by the name of the Molucca Crab, may rather be considered as one of the largest of the Cancridae, than an insect belonging to this genus.

## SPECIFICATION.

MONOCULUS PULEX. *M. antennis dichotomis, cauda inflexa.* *Linn. Syst. Nat.* 1. p. 1058. *Gmel.* 1.

*p.* 2999. *Fabr. Spec. Ins.* 1. *p.* 373. *Mant. Ins.* 1.

*p.* 240. *Ent. Syst.* 2. *p.* 491.

*Muller, Entomotr. p.* 82. *t.* 12. *f.* 4—7.

*Lederm. Microscop. t.* 75. *f.* 2

*Schaeff. Elem. t.* 29. *f.* 3, 4.

——— *Icon. t.* 150. *f.* 5. *a. b.*

Inhabits stagnant water. Is sometimes so abundant as to tinge the water of a reddish colour.

Pl. 83. *a.* The natural size. *b.* The same magnified.

MONOCULUS.



*M. Pulex.*



GENUS LXXXIV. *ONISCUS*.

## GENERIC CHARACTER.

*Antennæ* setaceous, bent at an angle, and composed of 5 or 6 distinct articulations. *Mouth* with two toothed jaws and four filiform palpi. *Body* oval and annulated. *Feet* fourteen, ending in a simple nail, somewhat hooked.

*General Observations.*

The Onisci, commonly known by the name of Wood-lice, are of very retired habits. They but seldom appear in the day time, seeming to shun both the light and heat of the sun. They are mostly found under stones, in the crevices of walls, in cellars, and in subterraneous places. When undisturbed they move slowly, and their many legs seem but of little comparative use to them even in flight. The majority of the species are either so sensible, or so timid, that they roll themselves up as soon as they are touched; and, like the hedgehog, present a ball without the slightest appearance of head or feet. In this state they remain till they think the

danger past, when they gradually unfold, and slowly walk away.

The Onisci are viviparous, and the young are perfectly similar to the mother in the conformation of all their parts, except that the head is larger, and the antennæ thicker in proportion. They are born about the end of August; and Degeer, whose accuracy is not to be doubted, observed that the young when first hatched had but six pair of feet, absolutely wanting that seventh pair, and the corresponding ring to the body, with which they are all provided when full grown. These parts must be developed at some period between the time of their birth and their maturity, but the precise point at which this happens, has not as yet been discovered. In the progress of their growth, they often change their skin, and their remnant, which we sometimes meet with in the fields, or in the houses, is a thin white membrane, bearing the impression of that body to which it once belonged.

The Onisci feed on different substances; on leaves, on plants, and on fallen fruit. Most of





ONISCUS.



*O. Asellus*

them live on the earth, but some inhabit the water. Of these the *O. aquaticus* is sometimes seen, like a small shrimp, swimming in our cisterns; while the marine species, the *O. Entomon*, of comparative gigantic size, measuring near two inches, is found about rocks, and under the arches of bridges, &c. subject to the tide.

One of the kinds, though no longer in fashion, was once the favourite of the physician, and extolled for virtues which it never possessed. The *O. Armadillo*, or Medical Wood-louse, has a dark and polished surface, and when rolled into a ball and dried, was administered by the name of Millepede, with equal efficacy, in many disorders.

## SPECIFICATION.

ONISCUS ASELLUS. *O. ovalis*, cauda obtusa, stylis simplicibus. *Linn. Syst. Nat.* 1. p. 1061. *Gmel.* 1. p. 3013. *Fabr. Spec. Ins.* 1. p. 379. *Mant. Ins.* 1. p. 242. *Ent. Syst.* 2. p. 397.  
*Degeer, Ins.* 7. p. 547. t. 35. f. 3.

*Schaeff. Elem. t. 92.*

——— *Icon. t. 14. f. 5, 6. & t. 155. f. 1.*

*Panzer, Faun. Ins. Germ. fasc. 9. t. 21.*

Inhabits houses, walls, cellars, &c.

Pl. 84. a. The *O. Asellus*. b. A variety. c. The head enlarged. d. One of the antennæ magnified.

GENUS LXXXV. *SCOLOPENDRA*.

## GENERIC CHARACTER.

*Antennæ* setaceous. *Palpi* two, filiform, and articulated. *Body* depressed. *Feet* numerous, of an equal number on each side with the segments of the body.

*General Observations.*

The Scolopendræ vary greatly in size. The largest of those found in Europe scarcely exceed two inches in length, while those of India are at least four times as long. They live in holes in the ground, in decayed wood, under stones, and in other dark and humid places. The appearance of the larger kinds is very formidable, and the bite extremely painful. Leuwenhoek, who examined the strong, crooked fangs of these insects, found near the point an opening, which extended to the base, and through which an acrid liquor is ejected into the wound, causing that severe degree of pain and inflammation, which constantly succeeds the bite of the tropical Scolopendræ. India,

Africa, and the hotter parts of America, are alike subject to these hideous insects ; and the negroes, whose occupation leads them into the woods and uncultivated places, often suffer severely from their bite. They sometimes insinuate themselves into the houses ; and there are districts where they are so common, that the inhabitants are obliged to set the feet of their beds into pans of water, to prevent the Scolopendra from climbing the posts, and hiding itself between the sheets.

Of the European species, which are perfectly harmless, there is one, the *S. electrica*, that, when disturbed, emits a beautiful, greenish, phosphoric light. Another, the *S. subterranea*, although it inhabits the same damp places, and is so alike in shape and make as to be sometimes mistaken for the same species, is totally devoid of that beautiful lamp, which the former can illuminate at pleasure.

#### SPECIFICATION.

SCOLOPENDRA COLEOPTRATA. S. pedibus utrinque quatuordecim, thorace coleoptrato. *Linn.*

SCOLOPENDRA.



*S. colicoptrata.*





*Syst. Nat.* 1. p. 1062. *Gmel.* p. 3015. *Fabr. Spec. Ins.* 1. p. 531. *Mant. Ins.* 1. p. 341. *Ent. Syst.* 3. p. 389.

*Pall. Spicil. Zool. fasc.* 9. 85. t. 4. f. 16.

*Panzer, Faun. Ins. Germ. fasc.* 50. t. 12.

Inhabits Europe, and is found in Spain and Germany in dunghills and other damp and dirty places.

Pl. 85. a. One of the legs magnified.

GENUS LXXXVI. *JULUS*.

## GENERIC CHARACTER.

*Antennæ* moniliform. *Palpi* two, articulated.

*Body* semi-cylindrical. *Feet* numerous, twice as many on each side as the segments of the body.

*General Observations.*

In the *Scolopendra* the body is flattened; in the *Julus* it is nearly cylindrical. This is a strong distinctive character, independent of the number of legs; the latter having two pair to each joint, or segment of the body, while the former has but one. These insects are found in decayed wood, under stones, and in moist and shady places. They are perfectly harmless, notwithstanding the contrary opinion maintained by some tropical travellers, who have evidently mistaken them for *Scolopendræ*. They are oviparous, and lay in the ground a great quantity of eggs. The young are at first very deficient in the number of legs, as well as of rings, or segments to the body; both of which



JULUS.



*J. terrestris.*

increase as the *Julus* advances in age, till the number appointed by Nature is complete.

The European species of this genus are small, and do not exceed an inch and a half in length; but there is one, the *J. Indus*, inhabiting the woods of Asia and America, which is seven inches long, and of a size in proportion. The *J. maximus*, a much larger species, though not so well known, is a native of South America. It has been noticed by Lister, in his "Journey to Paris," and figured also by Seba, in his first Volume, plate 81.

## SPECIFICATION.

**JULUS SABULOSUS.** *J. pedibus utrinque centum viginti.* *Linn. Syst. Nat.* 1. p. 1065. *Gmel.* p. 3019.  
*Fabr. Spec. Ins.* 1. p. 530. *Mant. Ins.* 1. p. 340.  
*Ent. Syst.* 2. .395.

*Geoff. Ins.* 2. p. 697. *t.* 22. *f.* 5.

*Schaeff. Elem.* *t.* 73.

Inhabits Europe, and is found under stones, and in the soft mould of hollow trees, where it is seen with its dark polished body, curled up in a flat spiral form.

Pl. 86. a. The head and antennæ magnified.

*References to Plates 16 and 17, omitted.*

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Pl. 16. a. Natural size. b. The same enlarged.  
c. Part of the antennæ, head, &c. magnified.

Pl. 17. a. Natural size. b. The same enlarged.  
c. The antennæ magnified. d. d. The fringed lips,  
with two of the articulated palpi, considerably enlarged.

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The Binder is directed to place each Plate at the *end*  
of its respective Genus.

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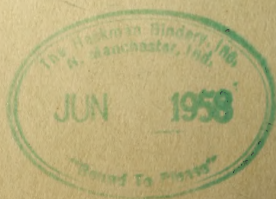
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